IRON AGE

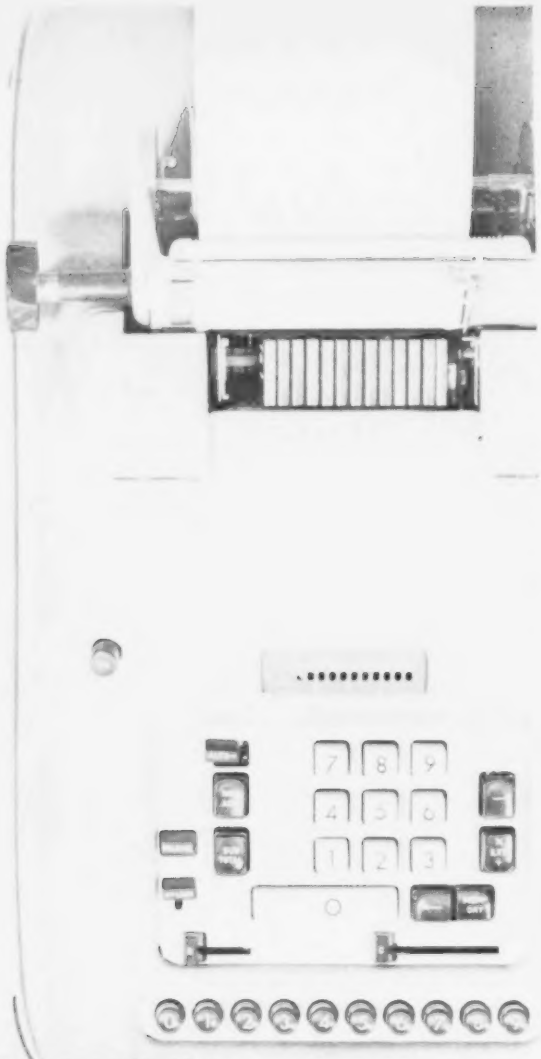
THE NATIONAL METALWORKING WEEKLY A Chilton Publication APRIL 20, 1961

Decision Makers Report On Business Outlook

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Are you adding up all the hidden costs of possession . . .



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April 20, 1961—Vol. 187, No. 16

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Special This Week

Executives Say Worst Is Over, But—

In this coast-to-coast survey by The IRON AGE, top executives who make the decisions for their companies report that business is on an uptrend. While their optimism is tempered with caution, they indicate their own business decisions will still be controlled by the need to move ahead. p. 101

Decision Makers Report On Business Outlook

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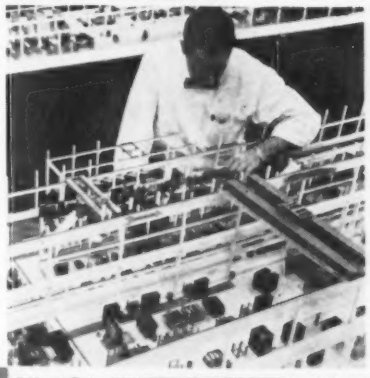
Better Packaging Can Boost Profits

Packaging engineers meeting in Chicago learned they must reduce annual packaging bills 7 pct a year to offset higher costs. But despite this, they agreed proper packaging can boost profits. Many new developments were featured at the show. p.106



How to Reduce Manufacturing Costs

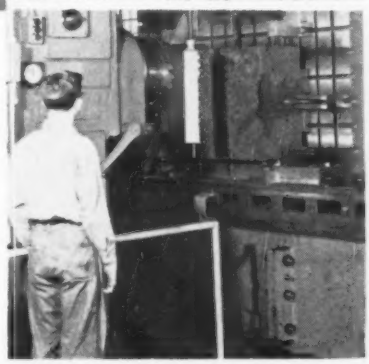
Rising costs and foreign inroads can be countered. But you've got to plan for the future right now. Progressive automation offers the only solution to spiraling expenses. Be on guard. Don't buy automated equipment without a master plan. p. 129



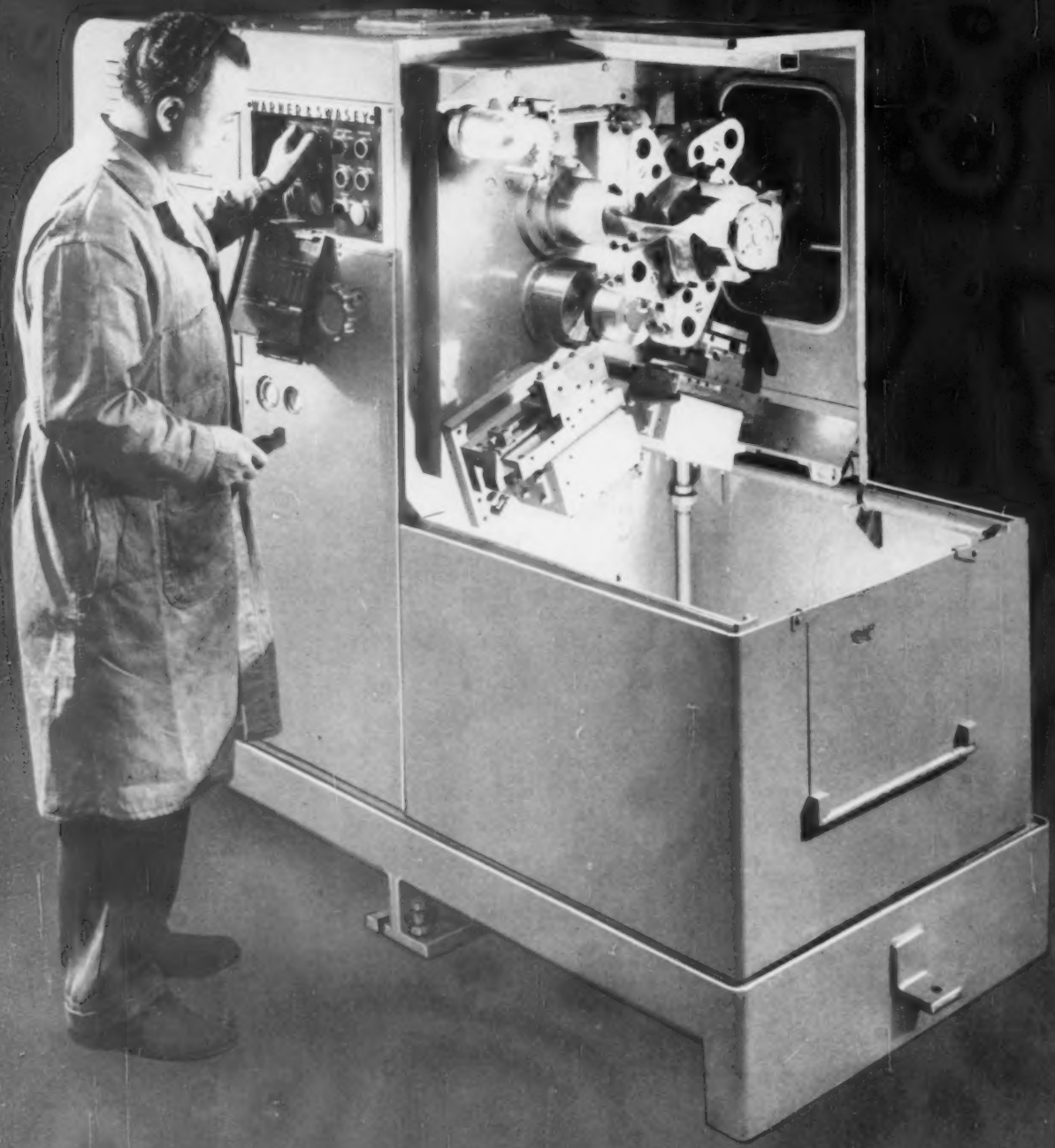
Next Week

Machinists Conquer Hard Steels

The missile, aircraft and nuclear industries are making wider use of hard steels. Are they machinable? Tool and die shops have been machining these steels successfully on a production basis. Learn how it's being done in next week's issue.



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The Peace Corps: It Requires Realism

The Peace Corps has been established. Any argument against it will fall on deaf ears even if the argument is logical and valid.

But it is not too late to look at this pilot Peace Corps idea with a little grim reminder that realism often routs idealism—at a cost to the idealist.

It is interesting that most of the Peace Corps sponsors and big names have had little experience with "living with the poor." Maybe they have had reports on them; studied them from afar, or have believed that "something could be done." But that is a far cry from what these youngsters will run into in Africa, South East Asia, and India.

By rule, the members must live with those they hope to help. It will take far more than a boot-camp strengthening of the muscles, etc., to keep the flesh willing, healthy, and able to help the under-privileged.

If there is not a cold, hard, and sure-fire weeding-out process in picking Peace Corps volunteers, it is going to be bad news—for the volunteers, for our government, and for the people we are supposed to help.

This is no attempt to decry the use of this Peace Corps—if for no other reason than that few know yet what it will do, how it will do it and what the results may be. But it is an attempt to bring home a few facts about how to "live" with the living that will probably cause some dainty stomachs to churn.

The probability of disease in the tropics and in the areas where the niceties of pure water, refined sewage practices, and food handling are a little different from ours is great. Weakness-prone volunteers ought to be left at home.

Others who are susceptible to every kind of malady, frustration, or discomfort ought to quit before they start. Others who think the Peace Corps is a gigantic lark (or possibly a prepaid binge) should be separated from those who are rugged enough to stand the first week or so in Africa, South East Asia, South America, or other parts of Asia.

And it will be well, too, to properly separate any deviates from the volunteers just as it will be well to forget to send those who want to mold our "friends" in an image of us.

When all this is done, it will still be hard enough for the survivors to live abroad while they try to do a good job.

Tom Campbell

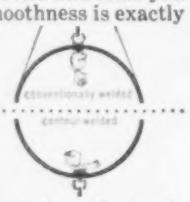
Editor-in-Chief



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The "Gravity Kid" shows how
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Just the opposite occurs in conventionally-welded tubings. There, gravity pulls the molten metal down into the tube. This can form a bead that is difficult to remove by cold working. And cold working can lead to undercuts that become focal points for corrosive attack, incrustation, and even failure from fatigue.

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Spring Sales Gather Momentum

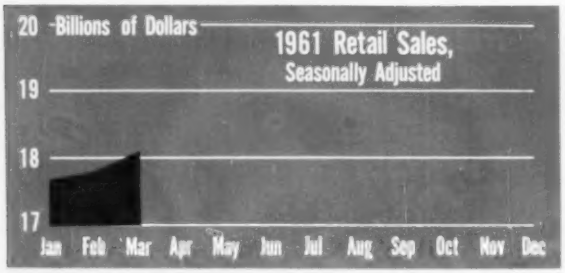
There's no question about it. Things are looking a lot better. There is some concern over a possible summer letdown and businessmen are afraid of a false start. They are understandably a little gunshy from last year's disappointments and forecasts that missed the mark.

But steel orders are better than in almost a year. The operating rate is approaching 60 pct of capacity. Here and there across the country, furnaces are being relighted. Auto production is picking up on the strength of better sales. Retail sales continue to pick up. So does the factory work week.

On the other side, few top executives look for anything better than a moderate improvement. Industry's decision makers, (See Special Report, p. 101) are generally optimistic on the business outlook, but are conservative in their estimates of the strength of the new upturn.

Retail Sales: Improvement Holds

Supporting the stronger rate of industrial output is a continued improvement in retail sales. March sales, are up for the second consecutive month, but are still probably about 1 pct below a year ago. But day-



to-day reports on retail sales indicate the rate of improvement is picking up. Big factor in the March improvement was a pickup in new car sales. As a result, purchases of hard goods were up 2 pct while soft goods held at the previous month's level.

A Fiscal Year for Auto Sales?

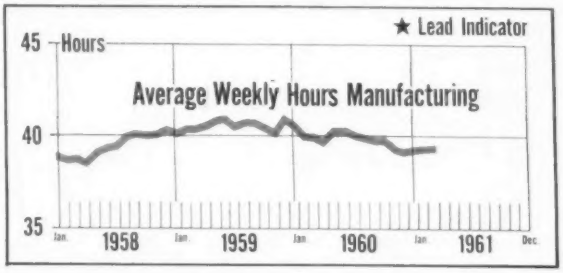
Do auto sales records based on the calendar year distort the sales picture? This is the contention of R. J. Eggert, marketing research director of Ford Motor Co. It makes some sense. For one thing, the fiscal year more closely embraces the model year.

Mr. Eggert points out that in the fiscal year ending in June, 1961, new car deliveries will be about 6 million. This is only about 400,000 lower than the previous fiscal year, and a lot closer than a comparison between 1960 and 1961 calendar years will be. For next fiscal year, Mr. Eggert predicts sales of about 6.8 million new cars.

It's Mr. Eggert's contention that use of fiscal years would place fluctuations in perspective and would soften impact of extremes in supply and demand that occur because of special conditions.

Not Much Overtime Yet, But—

The factory workweek is up only a bit. Actually,



it's about 12 minutes, bringing the hours worked for production workers in March up to 39.1 from 39 even in February. But the chart shows that this important lead indicator has stabilized and is moving up. Admittedly, it's at a slow pace and it's probably indicative of the expected rate of recovery—slow, but consistent.

Direct Reduction Moves Closer

Successful completion of a large-scale test in Europe —combining phases of the direct reduction process and the basic hot-blast cupola—has been announced by Allegheny Ludlum Steel Corp. The company did not announce specific plans for production here, but says the test established the process as "an alternate route to molten metal direct from iron ore."

Home Building Needs a Boost

Congressmen, other government people, and dozens of special groups are getting a little frantic about the home market. Incentives are slow in coming and the long hoped-for boost in home starts still hasn't materialized. It will take at least another six months before there is likely to be much change in the home market. And then it is not likely to be a major surge. This is one of the principal factors restraining enthusiasm for the rate of business pickup.



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Teamsters: Call For Automation Committee

The Teamsters Union was among the latest to testify before the Holland subcommittee on automation.



GIBBONS: Rare Appearance.

Appearance of the Teamsters before a Congressional committee in anything but a defensive role is rare for the Teamsters. But Harold J. Gibbons, executive vice president, told the committee that there should be some control over the introduction of automation.

He recommended setting up a National Commission on Automation Unemployment. It would have members from labor, industry, educators, and the public. Their task: Develop programs to ease effects of automation.

Extend Job Ban To Convicted Managers ?

Attorney General Robert Kennedy is pushing for legislation to put management in the same category as union officials if convicted of certain crimes.

He is considering proposing an amendment to the Labor Reform Act. It would prevent management officials from holding jobs after being convicted of certain crimes.

UAW: More Clues To Auto Demands?

In bits and pieces, probable demands to be made this summer on the auto industry by the United Auto Workers are beginning to take shape. Contracts with the Big Three are due to expire Aug. 31.

UAW president Walter P. Reuther last week told local and regional union leaders that the first concern of negotiators will be to provide more job security.

He didn't mention specific demands. However, he did say the UAW will work hard to improve the six-year-old Supplemental Unemployment Benefit plan. Among "improvements" to be sought: Increases in the amount and duration of SUB; added protection for workers on short workweeks; and better severance pay provisions.

Michigan's Blue Cross-Blue Shield medical coverage program also may play a part in auto industry negotiations. Higher rates go into effect in June. The union is expected to demand that the companies pay the total health coverage cost.

Mr. Reuther said the UAW will strive for "maximum flexibility" in contract demands rather than be forced into an "unpopular" strike over issues which wouldn't have rank and file support. Interpretation: Demand for a "fat" wage hike is unlikely.

AFL-CIO: At the Crossroads?

The merged unions of the AFL-CIO appear to be rapidly approaching the crossroads of decision: Can labor leaders solve the differences between the industrial and craft unions, or should the five-year-old merger be dissolved?

Dissension has flared into the open in recent weeks. Disenchantment has become more pronounced.

House Labor Subcommittee Hearings on the common situs picketing bill were postponed last week for a week. This was to give building trades unions and industrial unions more time to work out differences (IA—Mar. 30, '61, p. 9).

The Industrial Union Department has threatened to withdraw support of the bill unless similar protection is extended to industrial unions as well. Craft unions believe this would kill the bill.

Leaders of more than 30 industrial unions met informally last week at the invitation of UAW president Walter P. Reuther and IUE president James B. Carey. Out of the closed meeting came a demand to speed action to end interunion warfare within the AFL-CIO—in short, solve jurisdictional disputes.

Craft unions have blocked just about every attempt to work out binding agreements to end raiding, boycotting, and jurisdictional disputes between the unions.

Charges Mr. Reuther, "We think that to continue to tolerate a situation in which unions comport themselves in a manner inconsistent with trade union morality would be a disservice to the American labor movement."



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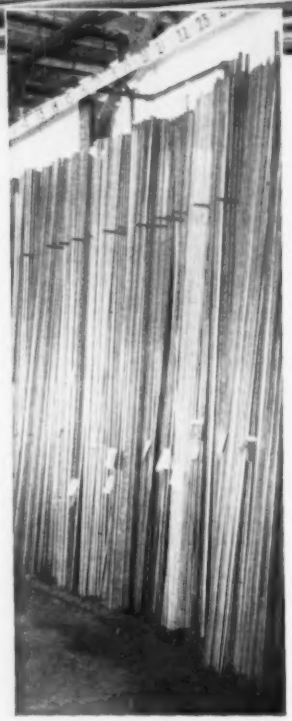
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★ Industry Losing Patent Fight

The running battle over who should get rights to patents developed with government money—industry or government—is going heavily against industry.

Congressional irritation has reached a point where government control of patents seems almost inevitable.

Senate investigators say: "The Congress should not continue to vote enormous defense appropriations for scientific research without assuming responsibility for disposition of the resulting inventions."

The latest attack from these investigators was an accusation against the Pentagon. They accused the military of giving "unearned bonuses" to defense contractors who develop patents with government money.

A Senate Subcommittee on Patents charges that the Defense Department spends billions of dollars "irresponsibly" because its research contracts do not provide that the patents must be earmarked for public use. Present procurement regulations allow industry to retain these patent rights.

The Subcommittee says that patents "should not be given as unearned bonuses from the U. S. Treasury to research contractors whose efforts have been made possible by general congressional appropriations without any legislative provision for a patent policy."

Legislation, not to the liking of defense contractors, is planned to resolve the controversy. Meanwhile, the committee proposes that the Defense Department change its regulations by administrative action.

■ Commerce Studies Business Ethics Code

The Department of Commerce is working on a "code of ethics" for the business community.

Commerce Secretary Luther Hodges says representatives of business, labor and the clergy will be asked to discuss the idea of a ethics code for business in early May.

Business representatives say they would balk at a "code of ethics." They are afraid it would be anti-trust activity in the form of "moral persuasion."

■ Top-Level Export Control Likely

President Kennedy is expected to set up a top-level board of review for export control procedure. The board would review applications for export licenses.

The idea stems from the controversy created by the on-again, off-again shipment of grinding machines to the Soviet Union. The license for export of the machines was revoked after long delay.

The board of review would be designed to end such controversies. The biggest complaint is that it takes too long to get a license.

■ U. S. Keeps Watch On Import Metal Needs

The U. S. government is stepping up its foreign mineral activities because of domestic mineral deficiencies.

Government spokesmen warn that "effective programs for developing the nation's mineral resources must reckon with international competitive factors."

The government program includes compilation and analysis of data on foreign resources, production, consumption, international trade, technology, and actions of foreign governments that affect production and international movement of minerals.

■ JFK Begins Agency Revamp—Gently

President Kennedy began his revamp of the Federal regulatory agencies with a soft touch. But he will take a heavier hand in the reorganization later.

The President's message to Congress for streamlining the agencies fell far short of the drastic changes suggested to him earlier this year. But he left the door open for future changes.

The message calls generally for a speed up of agency business, for more coordination of regulatory policy, and for better caliber personnel.

But backers of the reorganization make it clear that this is "just the beginning." More detailed work will be carried out by an "Administrative Conference of the United States." This group will be set up by executive order and will tackle problems common to all agencies.

■ Interior Dept. Works On More Lead-Zinc Aid

The U. S. Interior Department is working on a new Federal aid program for lead and zinc producers.

Interior Secretary Stewart L. Udall says his department is working on a plan which will go further than subsidies to the lead-zinc industry. He says a subsidy program is not the solution. "Steps beyond that must be taken," he notes.

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since it is non-flammable. You can use IMMUNOL safely anywhere in your plant. It is non-toxic so operators can use it without fear of dermatitis, toxicity or skin irritations.

There are specific grades of IMMUNOL for cleaning and rustproofing all metals. Write, wire or call giving us your application and we will send you a free sample for test purposes and a booklet describing the many outstanding results users have obtained with IMMUNOL.

HARRY MILLER CORP. HAMICO 4th & BRISTOL STREETS PHILADELPHIA 40, PA.

Manufacturers of
IMMUNOL, STEELGARD, ACTIVOL,
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HARRY MILLER CORP.

Original Products and Processes Since 1936

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Iron Ore Range In Costa Rica

A new iron ore range has been discovered on the west coast of Costa Rica. The Central American discovery was made recently by A. W. Dugan, a mining engineer from Houston. It has been confirmed by the Costa Rican Bureau of Mines.

There is real significance to the new range. With world consumption of iron ore approaching an annual rate of 500 million tons, new sources are desperately needed. This particular range is in a strategic location to benefit Japan and the U.S. with low transport costs. Deposits actually touch Pacific beaches and can easily be shipped to the West Coast.

Another factor: There are no export restrictions for iron ore in Costa Rica. Export restrictions slow ore development in Mexico and Brazil.

Already, offers to purchase the ore and aid in developing the range are coming from Japan, Europe, Canada and the United States.

New Zealand Steel?

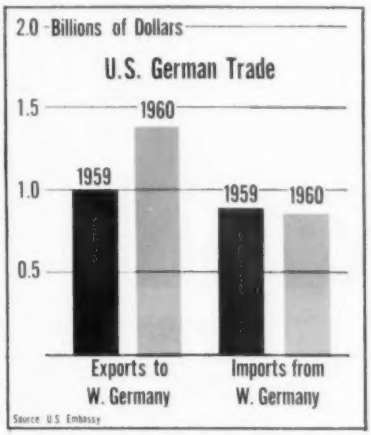
The New Zealand government has retained Battelle Memorial Institute to determine the technical and economic feasibility of creating an iron and steel industry there. Prime Minister John Ross Marshall says Battelle will work with the government-owned New Zealand Steel Investigating Co. on the research.

Germans Aim For Trade Gap Reduction

Look for the Germans to push for more U.S. sales this year. In fact, the German Embasssy says more time and energy is going into increasing imports here.

The reason: The export-import ratio between the U.S. and Germany turned out favorable to the U.S. last year. Exports to West Germany were up; imports dropped.

Value of exports climbed to $1.4 billion. That's a 30 pct increase



over 1959 and a record high. On the other hand, U.S. imports fell from 1959's value of $889 million to $887 million.

The U.S. trade surplus with the Germans last year came to $536 million. The surplus in 1959 was $191 million.

Biggest gains in sales to West Germany in 1960 came in the second quarter. The growth rate for that period, as compared to the second quarter of 1959, shows a 42 pct gain.

Cuba's Economy Could Regain Strength

There's a good chance that Fidel Castro's economic planners may succeed in bringing Cuba's struggling economy to its feet.

At least this is the opinion of James O'Connor, an economist at Barnard College. He recently returned from a two-month Cuban study trip.

Mr. O'Connor says the future of Cuba's economy is based on three factors: 1. A willingness to experiment with central planning (government control); 2. an emphasis on light industry; 3. a reliance on Soviet bloc aid.

He notes: "Barring a full-dress invasion by forces now training in Florida and Guatemala, the odds are that Cuban planners will succeed in modernizing the island's economy and, at the same time, maintain the material standards of the island's peasants and workers."

French Aim For Stable Prices, Wages

The French government is apparently leery of prices and wages that are climbing too fast.

Prime Minister Michael Debre has issued a warning to M. Georges Villiers, president of Patronat Francais—the equivalent of the American Manufacturers Assn.

Warning: Hold the line on prices and wages.

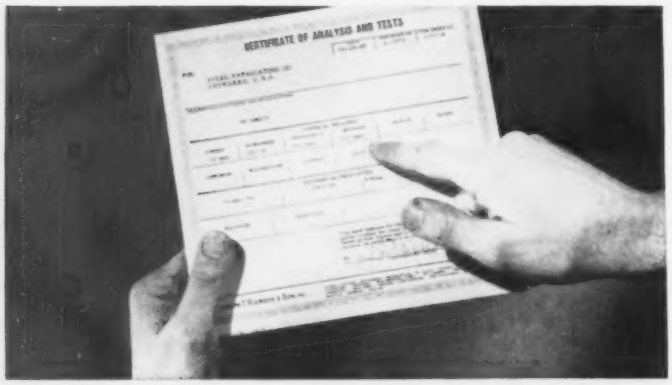
In an effort to curb rising prices, the French government plans to reduce tariffs 5 to 10 pct soon. Then price control reportedly will be abolished and free prices would regulate the market. There are now, for example, strong price controls on autos and certain mechanical industries.

This could also mean the French won't be lowering tariffs again at the end of the year. The only reduction might be a difference between the currently proposed drop and the agreed decrease among the European Common Market.

Business Machines

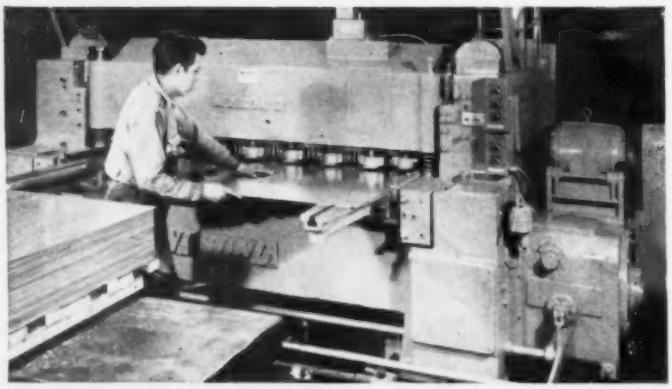
Exports of business machines from the U.S. last year rose 43.6 pct over 1959 levels. Imports were up 47 pct. According to the Dept. of Commerce, 1960 exports totalled $208.9 million compared to $145.5 million the year before. Imports totaled $76.5 million compared to 1959's $52 million.

How Ryerson gives you EXTRA VALUE IN SHEET STEEL



Carbon control—Did you know that Ryerson can furnish a conformance report, if requested when your order is placed, certifying that hot or cold rolled low carbon sheets in stock sizes are SAE 1008 with maximum carbon content of .10? This means you can minimize or eliminate problems of variation in formability and weldability.

Closest cutting tolerances—Our standard "aim" tolerances are the closest in the industry. For example, on shearing of sheets: width or length tolerance—under 48", ±1/32"; 48" and over, ±1/16". These limits can be guaranteed upon specific request, given in advance of processing your order.





Fast, dependable service—Hundreds of customers often cite these two major reasons for ordering from Ryerson: absolute confidence in "dependability of service as promised," and speed of service to meet their most critical requirements.

Whatever your sheet and strip requirements, a Ryerson specialist is ready to consult with you. A phone call is all it takes.

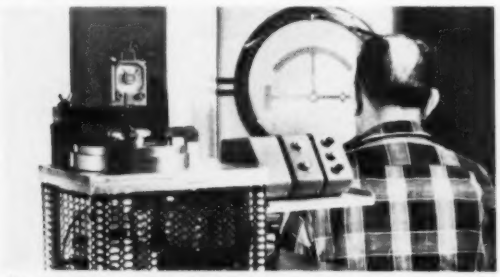
RYERSON METALOGICS

JOSEPH T. RYERSON & SON, INC., MEMBER OF THE STEEL FAMILY

STEEL · ALUMINUM · PLASTICS · METALWORKING MACHINERY

Close-Tolerance Lapping

Automatic gages control precision lapping operations at the Metals and Electronics Div., Hamilton Watch Co. One of the most critical lapping problems involves beryllium-copper balance wheels for watches. These parts are lapped flat within 0.0008 in. All other dimensions must be held within 0.0003 in. Electric-gaging systems allow one operator to handle several machines.



ELECTRIC GAGES: Insure precision lapping.

Cordless Electric Drill

A cordless electric drill just announced by Black & Decker for fall marketing is a breakthrough that may someday mean a major change in industrial power tools. The lightweight unit, powered by rechargeable power cells, will drill 30,000 ½-in. diam holes in ¾-in. fir before cell replacement. It's intended for farmers, boatmen, etc. The present unit is not for industrial use.

Automation Inside Press

An ingenious new concept in die design combines transfer-die methods with the progressive-die principle. In one instance, this marriage of automated ideas doubled the output of stamped-metal parts. It allows work that normally calls for at least four setups in individual presses to be done in a single press.

Flying Sparks, Free Power

Flying sparks, silent sound and "free" electrical power from waste heat will be featured at the Lead Industries Assoc. exhibit at next month's Design Engineering Show. The flying sparks will come from a candy-bar-size device called a spark pump. This piezoelectric generator yields a 20,000-v spark. Another device will convert heat to electric power, without any moving parts. Also featured will be a bucket of noise: An enclosure that depicts lead's sound-stopping power.

Braze Critical Assembly

Controlled-atmosphere brazing maintains tolerances of ±0.002 in. in assembling turbine rotors for missiles. Each 10-in. diam rotor assembly consists of 63 blades, brazed to an A-286 alloy hub. The root of each blade is dipped into a paint-like brazing preventive. This limits the brazing-alloy flow onto the hub surface. As brazing takes place in a pure dry-hydrogen atmosphere, a holding fixture insures proper blade-to-hub clearance. Brazing heat is 1950°F, ±10°.

Controls 18,000°F Heat

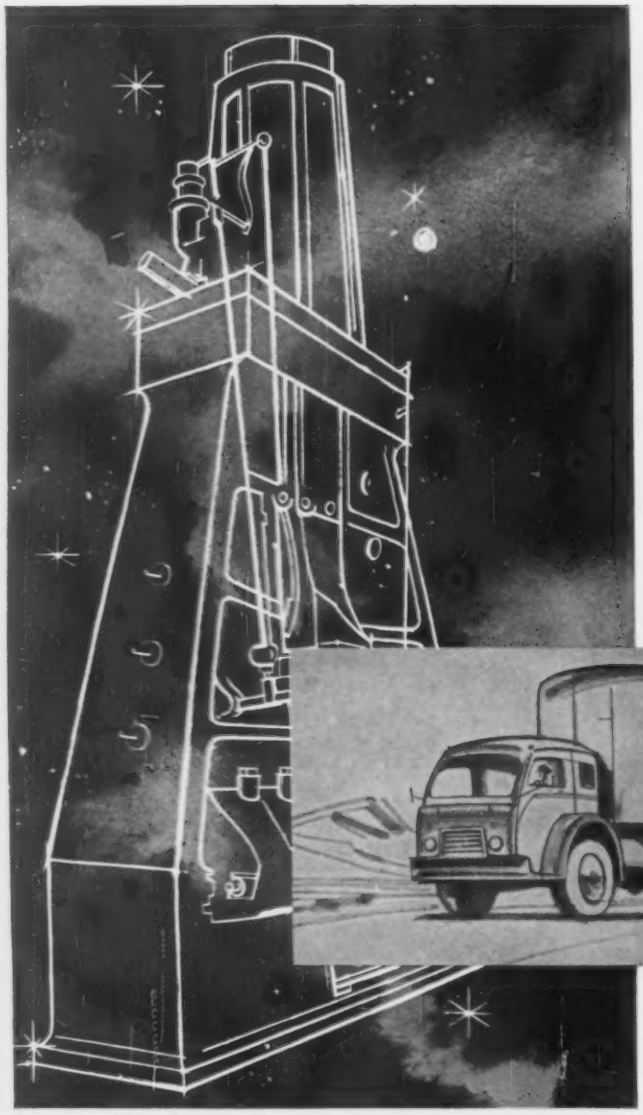
Without contacting hot surfaces, an automatic pyrometer gages and controls temperatures up to 18,000°F. It uses a photosensitive detector to balance the brightness emitted by a target with that of a standard pyrometer lamp inside the instrument. The null-balance system is accurate within ±0.5 pct. Reproducibility is about 1°F.



CALIBRATION CHECK: Use standard lamp.

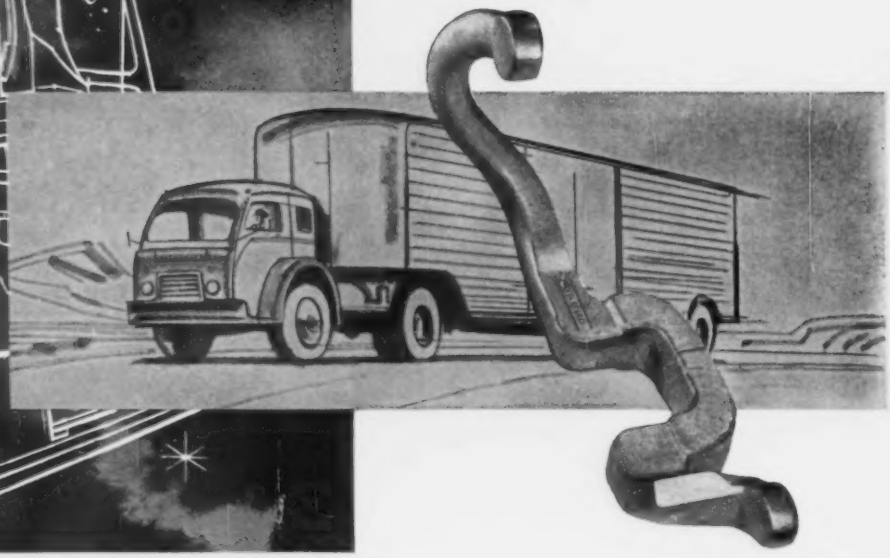
Shatterproof Lights

One of the most common safety hazards centers on exploding light bulbs. This hazard has been conquered with a new incandescent lamp. The newcomer uses silicone adhesives and glass yarns. It's truly shatterproof. While in use, it can be dipped in ice water without danger of flying-glass fragments. When dropped on a hard surface, the new bulb doesn't explode and shower glass.



Typical steam forging hammer

REQUIRED SAFETY FACTORS in steering arm assured by designing it to be forged



By designing with forgings, a truck manufacturer can count on the required safety factors, with minimum "beefing-up" of parts to offset unknown internal structures or non-homogenious materials.

You, too, can achieve results like these by designing *with forgings* either at the start or on re-design. The benefits of forgings are equally impressive, whether you make home-workshop equipment or diesel engines.

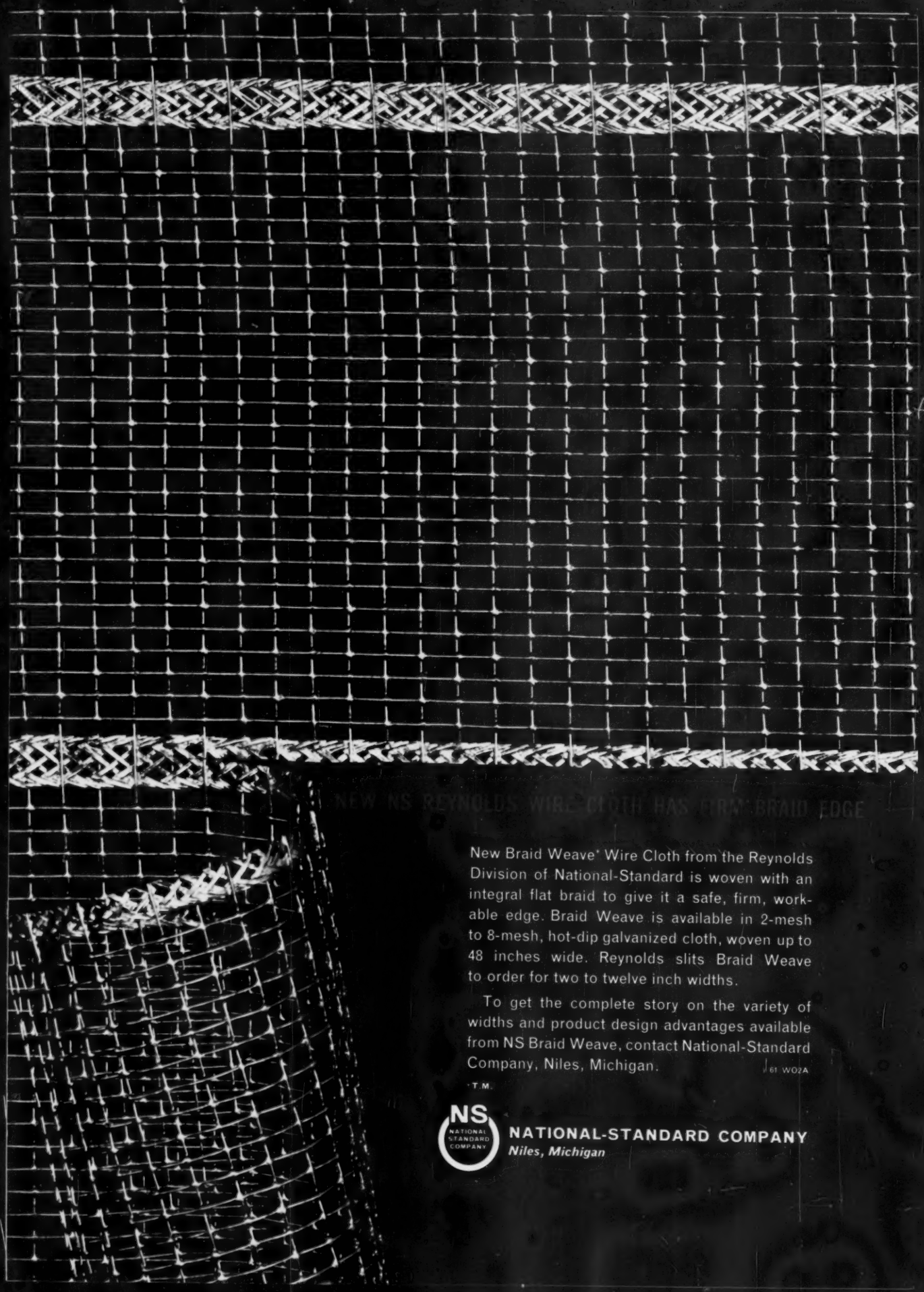
Forgings start as *better* metal . . . are further *improved* by the hammer-blows or high pressure of the forging process.

Write for literature on the design, specification, and procurement of forgings.

When it's a vital part, design it to be FORGED

Drop Forging Association • Cleveland 13, Ohio

names of sponsoring companies on request to this magazine



New Braid Weave* Wire Cloth from the Reynolds Division of National-Standard is woven with an integral flat braid to give it a safe, firm, workable edge. Braid Weave is available in 2-mesh to 8-mesh, hot-dip galvanized cloth, woven up to 48 inches wide. Reynolds slits Braid Weave to order for two to twelve inch widths.

To get the complete story on the variety of widths and product design advantages available from NS Braid Weave, contact National-Standard Company, Niles, Michigan. 61 WO2A

*T.M.

NS NATIONAL STANDARD COMPANY

NATIONAL-STANDARD COMPANY

Niles, Michigan



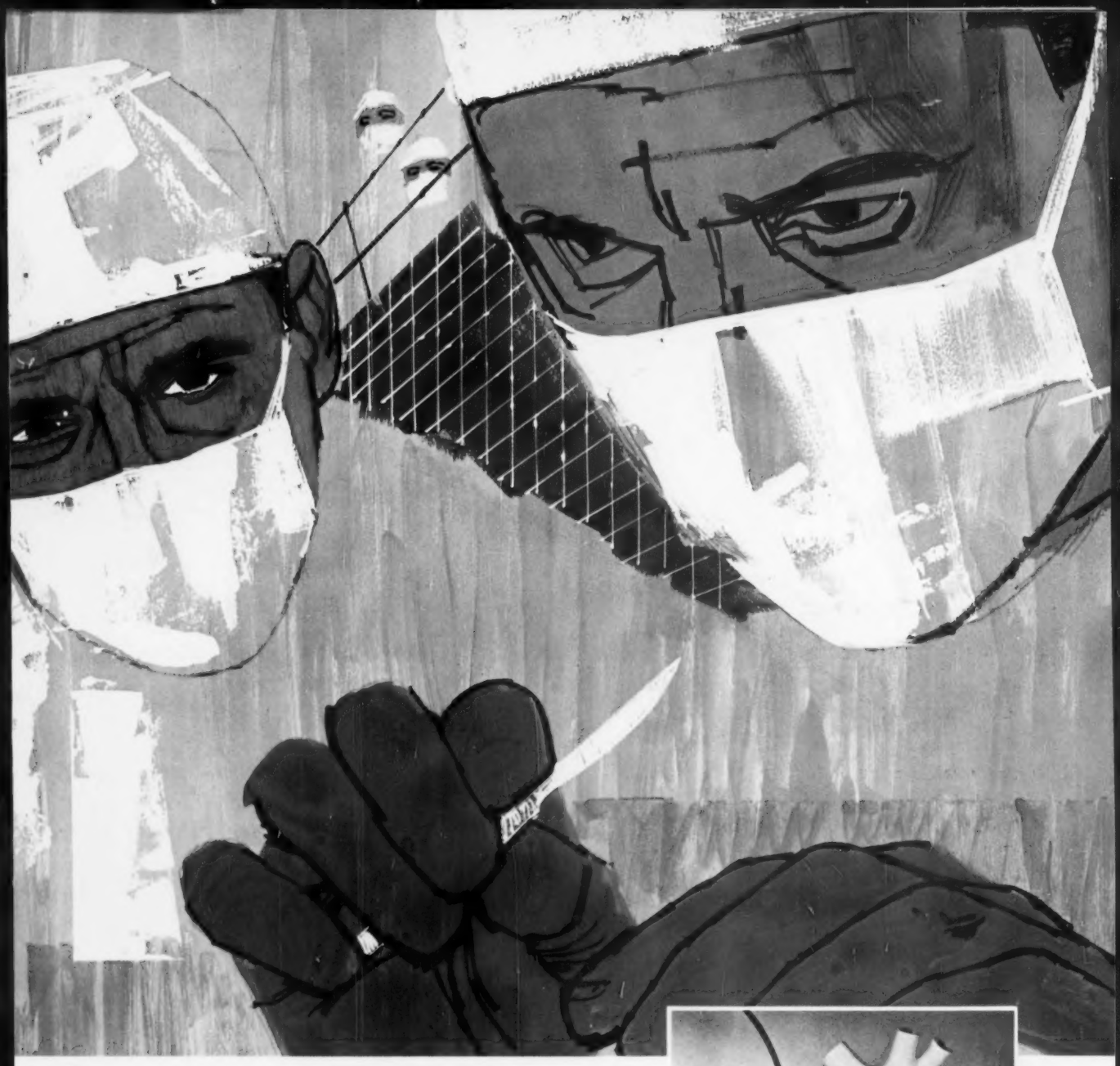
NS SPECIAL WIRE TRANSMITS

Doctors are saving more lives today in heart surgery cases through the transmission of carefully timed electrical pulses into the heart. Many patients suffering from lost heartbeat due to surgery or other causes have been restored to active life through such heart stimulation.

A Leading Medical Instrument Company developed a pocket-size electronic package to generate the electrical impulse, which is transmitted to the heart through the jugular vein by a tiny stainless steel braided wire.

In their search for the right conductor to carry the electric pulses to the heart, researchers came to National-Standard for help in developing a wire flexible enough to follow the intricate path of the circulatory system, while, at the same time, soft enough to avoid damaging the blood vessels or the heart itself. In addition, the wire had to be very thin, strong enough to withstand the constant flexing of the heart, and with just the proper electrical characteristics.

National-Standard Engineers developed a braid of 16 wires, each .0036″ diameter, or about the thickness of human hair. Using type 302 stainless



SPARK OF LIFE

steel wire, NS engineers produced a braided wire with high tensile strength, good resistance to fracture, good conductivity and flexibility just right for the delicate application.

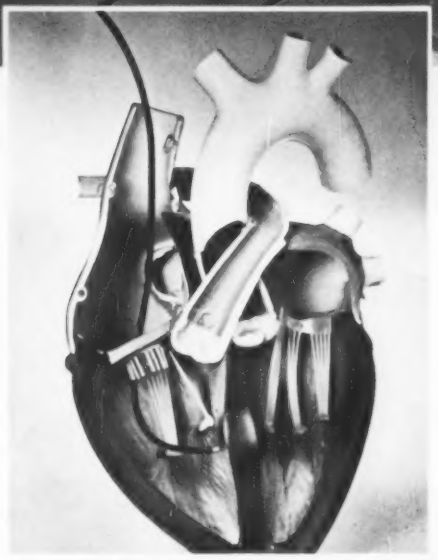
EXPERIENCED ENGINEERING HELP of this kind, for jobs requiring high-quality wire, to meet special or unique applications, is available to you from National-Standard. Write for additional information to National-Standard Company, Niles, Michigan.

NS NATIONAL STANDARD COMPANY

Manufacturer of Specialty Wire and Metal Products

NATIONAL-STANDARD COMPANY

Niles, Michigan



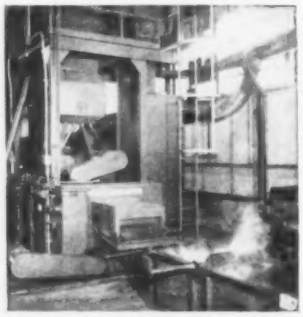
NS SPECIAL WIRE transmits spark of life from transistorized, battery-powered package, through jugular vein, to the heart. Carefully timed electrical pulses train tired hearts to beat normally again.

Non-stop **blast** cleaning straightens out **wire rod** descaling

A demonstration of WHEELABRATOR'S

VITAL VALUES

Multiple strands of hot-rolled rod proceed through blast cleaning, patenting, and coating in one continuous straight line operation at Leschen Wire Rope Division of H. K. Porter Co., Inc. Wheelabrator mechanical blast descaling is the essential step that makes this automated processing possible. Floor space is reduced, pickling is eliminated, various surface finishes are possible and cleaning time is reduced, all of which add up to impressive cost savings. Wheelabrator's unequaled experience in blast descaling of wire is at your service. It is another of Wheelabrator's Vital Values that mean bigger savings for you.



Wire rod can be straightened, blast cleaned, coated, drawn and cold headed in one continuous, straight-line operation. For full details, ask for Bulletin 148-D.

VITAL VALUES FOR INDUSTRY

WHEELABRATOR WIRE ROD DESCALING

WHEELABRATOR CORPORATION, 510 S. Byrkit St., Mishawaka, Indiana. In Canada, WHEELABRATOR CORPORATION OF CANADA, LTD. 1901 Birchmount Rd. P.O. Box 490, Scarborough, Ontario

A subsidiary of Bell Intercontinental Corp.

Consumer Clubs

Sir—In the March 9 issue of The IRON AGE we read about consumer clubs in the Market Planning Digest. Could you give us more information about these clubs?—C. E. Cook, Wharton, N. J.

▪ **For more information contact the National Assn. of Consumer Organizations, 9424 Dayton Way, Beverly Hills, Calif.—Ed.**

Here's Orchids

Sir—Please send six copies of the article "Are Welding Codes Outdated?" by R. Weck. (IA—March 16, '61) This has been one of our pet peeves here at Willamette Iron and Steel Co. for many years. Orchids should go to Mr. Weck for this article. Perhaps the six reprints can do something toward the solution.—Fred D. Mondin, general superintendent, Willamette Iron and Steel Co., Portland, Ore.

▪ **Reprints will be mailed soon.—Ed.**

Japanese Series

▪ **Our current series of articles on Japanese industry by Editor-in-Chief Tom Campbell is drawing large numbers of reprint requests. Among the comments are these:—Ed.**

"I have read your articles on Japan with much interest."—**Don Woodruff, vice president, The Robertson Fence Co., Cincinnati, O.;** "These articles interest us very much and we look forward to more." **D. Z. Reynolds, manager, Poly-Chem, Indianapolis, Ind.;** "We have very close contact with the steel industry in Japan and find these articles by Tom Campbell most interesting." — **P. A. Mills, president, Moody Engineering Co., Pittsburgh, Pa.;** "The articles in The IRON AGE on Japan are quite worth remembering."—**S. Fujimura, Kinoshita and Co., Ltd., New York, N. Y.;** "May I thank you from the bottom of my heart for the well-informed and excellent articles on Japan."—**George Hixon, Webster Groves, Mo.**

Keeping Workers

▪ **The following comments have arrived at The IRON AGE editorial offices concerning the article "How to Retain Skilled Workers" which appeared in the March 23 issue.—Ed.**

"It is the best article on retaining workers that I have ever read."—**Frank Smith, superintendent, Chicago Wheel & Manufacturing Co., Chicago, Ill.;** "I have enjoyed this article very much and appreciate the service you have rendered."—**Louis L. Phillips, president, Max Phillips & Son, Eau Claire, Wis.;** "This is a splendid article and, we believe, quite useful." — **Paul V. Hartsel, Meriam Instrument Co., Cleveland, O.;** "It was an excellent and down-to-earth article on this problem."—**H. W. Harris, supervisor of personnel, Sylvania Electric Products Inc., Towanda, Pa.;** "This was a most interesting article."—**W. E. Maw, Roy, Utah;** "I'd like to have copies of this article for study by our Management Operations Board." — **William Chepulis, Itek Electro-Products Co., Cambridge, Mass.**



"A single picture is worth a thousand words, Johnson. So . . ."



JOHN E. POLIS
Senior Design Application Engineer of our Molecu-Dryer Division, reports on

LOW COST INSTRUMENT AIR DRYING

DELIVERY OF CLEAN, DRY AIR AT LOW COST for a "dry box" installation at one of our customer's plants . . . is now being accomplished with a Hayes MS Series Recirculating Molecu-Dryer. The same can be done for your instrument air system . . . where moisture causes rust, clogs up instrument ports, and creates freeze-ups in the air lines.

A NEW HAYES TYPE MSX MOLECU-DRYER has been developed to supply pure, dry air at −100°F and solve instrument air problems. An externally heated dryer, the MSX is a complete, compact, high-capacity unit featuring a simplified control system . . . makes drying and reactivating operations easy, automatic—at lowest cost ever.



SHELL AND TUBE DESIGN has been designed for safe, high pressure working ranges to 500 psig. Many other design innovations for which patents have been granted have also been applied to this and other Hayes Molecu-Dryer units. The unique feature of the new MSX, however, is the downflow stream which eliminates fluidizing of the desiccant bed, especially with high velocity flows.

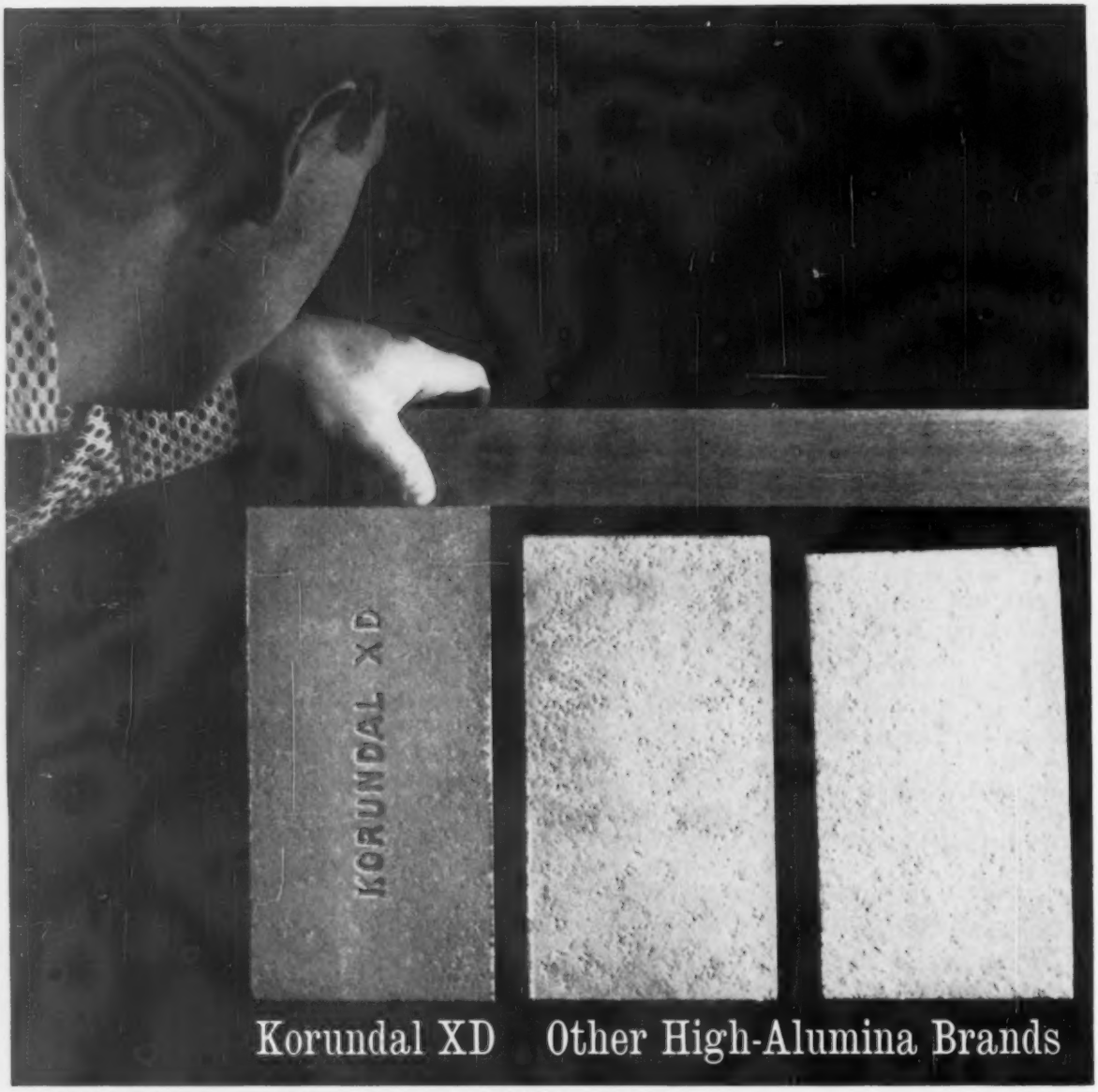
SHORT CYCLES — CONTINUOUS FLOW. Dry and purge circuits of the MSX are independent and completely automatic . . . operate in alternating 4-hour cycles. Larger size Linde® Molecular Sieves are used, together with down-flow adsorption, to increase flow rates as much as 3 to 4 times that of comparable dryers with upflow stream.

A WIDE SELECTION OF FLOW CAPACITIES and pressure ranges are available to meet your particular instrument air drying needs. Bulletin 1060C gives full details on the new Hayes Type MSX Molecu-Dryer. For your copy, write C. I. Hayes, Inc., 821 Wellington Ave., Cranston 10, Rhode Island.



C. I. HAYES, INC.
Established 1905

It pays to see Hayes for metallurgical guidance, lab. facilities, furnaces, atmosphere generators, gas and liquid dryers, pHayes-Master. (TM) power controls.



KORUNDAL XD shows no subsidence in extended 3000°F. Load Test

Test shows amazing Hot Load Capacity of new Harbison-Walker Refractory

The hot load test results on KORUNDAL XD compared with similar high-alumina brands are most revealing. Whereas, KORUNDAL XD showed no subsidence in a special, severe load test at 3000°F., the other brands in the same test deformed 5.1% and 9.6% (see above photo).

KORUNDAL XD is very dense, strong, and has good resistance to thermal shock. This unprecedented combination of high hot strength and improved physical properties will suggest solutions for many of your furnace problems. Our engineers will be glad to give you complete technical information.

HARBISON-WALKER REFRACTORIES COMPANY

AND SUBSIDIARIES

WORLD'S MOST COMPLETE REFRACTORIES SERVICE

General Offices: Pittsburgh 22, Penna.

HW 61-3

Decision Makers

We've been watching all the charts and indicators (with a close eye on our own Business Forecast page, too) trying to assess the business climate. For the record, we're optimistic.

But we come under that loose category of "observers," in contrast with the business executives who are on the profit line as decision makers. Part of our business is talking to as many of metalworking's decision makers as we can, and interpreting what they say in our evaluation of the business outlook.

Coast - to - Coast — This week, we're letting these metalworking executives, industry's decision makers, do their own talking. For our Special Report, IRON AGE editors in our coast-to-coast news bureaus, got on the telephone, haunted executive offices, talked to metalworking business leaders wherever they could.

How these decision makers view the business outlook, p. 101, should be of major importance in helping you make your own business decisions in the critical months and weeks ahead.

Silent Selling

April is an important month for the automatic vending industry in the U. S. It's the 75th anniversary of the issuing of the first American patents for vending machines.

This we learn from the National Automatic Merchandising Assn. which is full of facts about the industry. The month will be crowded with events to celebrate the anniversary, the Assn. says. Included will be open houses and equipment displays in banks and department stores, plus talks at civic luncheons and at regional meetings of the association.

Long, Long Ago—Later in the year, in October, the industry will hold the first International Conference of Automatic Merchandising in Chicago.

Silent selling actually goes back a long way into the past. The real "first" in automatic vending belongs to a Grecian high priest who lived about 2000 years ago. This man, Hero Cstebus, devised a simple vessel which dispensed holy water only on deposit of a coin.

The next development in vending came in China and Japan where "automatic" pencil sellers and a coin-operated toy were used.

The first American patents were on apparatus to sell tobacco products and postal cards.

New Indicator?

For those interested in business barometers, here's an encouraging one.

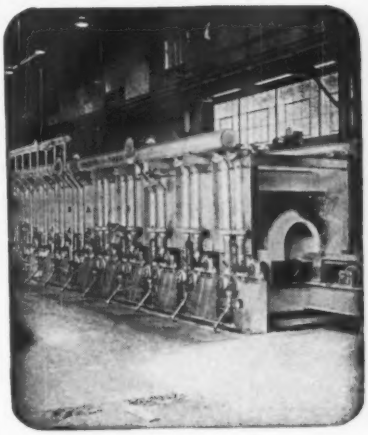
Wheels, Inc., an auto fleet leasing company, keeps records of the mileage salesmen put on their cars.

The theory: When business is bad, the salesmen run up more miles looking for orders. When sales come easier, mileage drops.

And, on that basis, business is getting better.



SPEED HEATING
SAVE SPACE
IMPROVE QUALITY
WITH HI-HEAD



R-S HI-HEAD HEATS 25 TONS SLAB PER HOUR..75% LESS FLOOR SPACE..ONE FOURTH LABOR

Now, heating of 25 tons of stainless steel slabs per hour is a continuous operation at Atlas Steels Ltd. The R-S Hi-Head Furnace reaches a high heat fast and maintains it uniformly in all parts of the furnace for the complete cycle. Heating time is reduced . . . there is no overheating of slab edges . . . and uniformity is assured on every piece. Labor is one-fourth that required on conventional furnaces. Floor space used is 75% less.

You can boost your "Quality Quota" if you heat with R-S Furnaces. For full technical details on faster slab heating write for the folder "Continuous Slab Heating."

R-S FURNACE CO., INC.
North Wales, Pa.

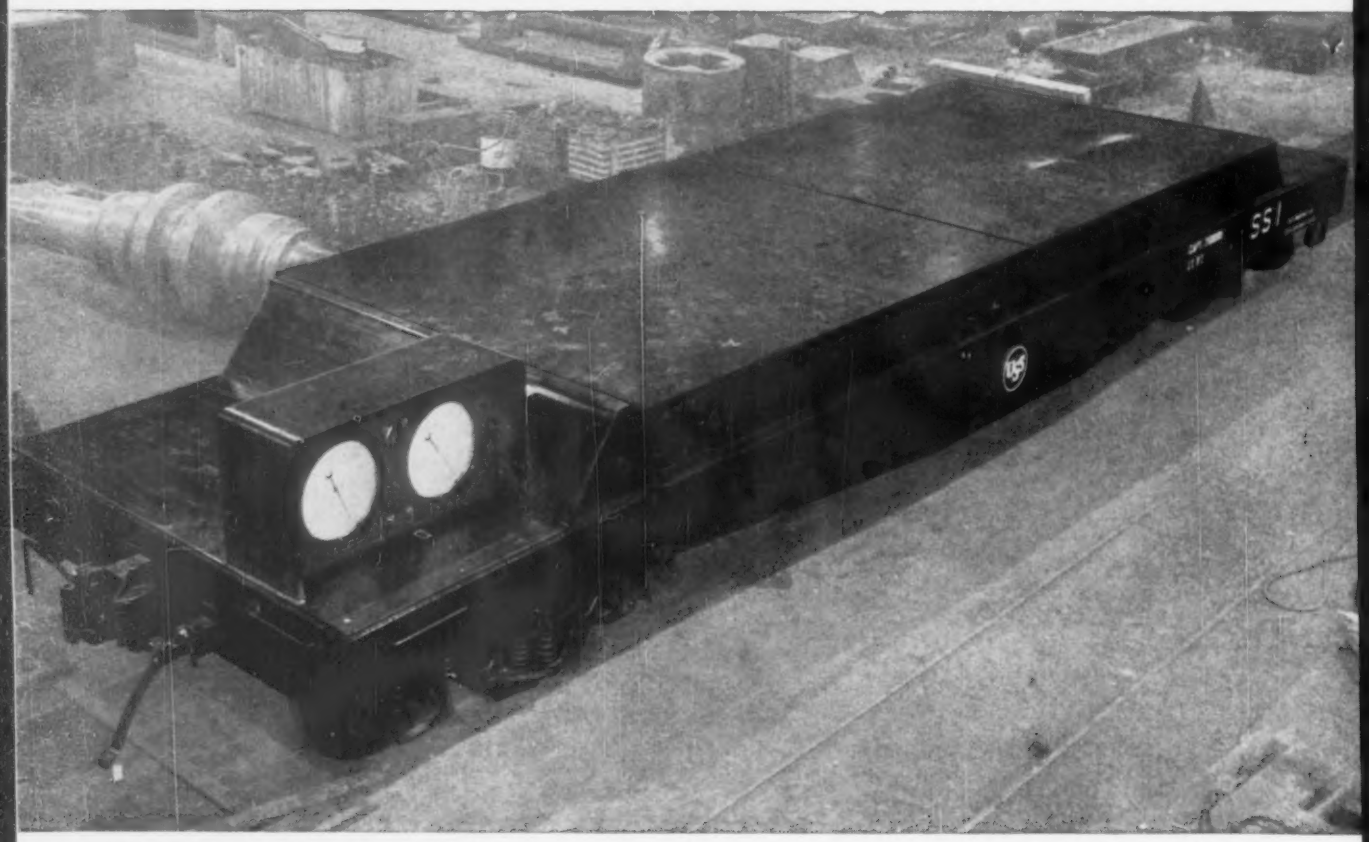
Car Hearth Furnaces
Continuous Furnaces
Rotary Hearth Furnaces

IHEA

R-S FURNACES

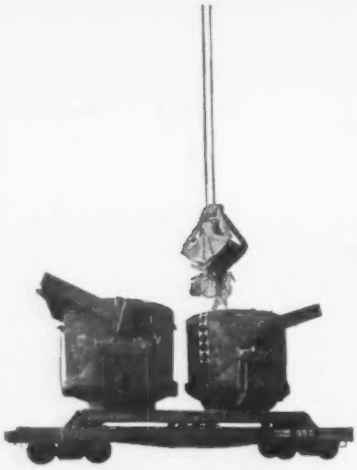
We think this all-purpose weigh car is too good to keep to ourselves

This mark tells you a product is made of modern, dependable Steel.



Weigh anything up to 100 tons, anywhere on the track, with this new, all-purpose weigh car. It's accurate to within two-tenths of one percent of anything up to 100 tons or two separate 50-ton loads. Because the hydraulic load cells need no power, you can weigh anywhere. A weigh car can pay for itself by eliminating guesswork and human error.

At McLouth Steel Corporation in Detroit, Michigan, they cut handling time by weighing stainless steel scrap and other expensive alloying ingredients right in their stock yard. Accurate weight records give them better control of inventory and charging mixtures and make it easier to find the yield cost. Other steel producers cut costs by weighing to contro' electric furnace yields. We build this all-welded, stress-relieved steel car to stand up under all of these uses and give long, dependable service.



Loading scrap at McLouth Steel does double duty because the weighing is done at the same time. This cuts handling time in the mill and gives better control of the charging mixtures.

USS Weigh Cars and other industrial cars are built to last by United States Steel, a company that also uses them! We can custom design and build any type weigh car to suit your needs. Send your weight problems to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

United States Steel Corporation, Pittsburgh
Columbia-Geneva Steel, San Francisco
Tennessee Coal & Iron, Fairfield, Alabama
United States Steel Export Company

United States Steel

USS

TRADEMARK

COMING EXHIBITS

Welding Show—April 17-21, New York Coliseum, New York. (The American Welding Society, 33 West 39th St., New York 18.)

Business Equipment Exposition—April 17-21, New York Coliseum, N. Y. (Office Equipment Mfg. Institute, 777 14th St., N. W., Washington, D. C.)

Powder Metallurgy Show — April 24-26, Hotel Sheraton - Cleveland, Cleveland. (Metal Powder Industries Federation, 60 E. 42nd St., New York 17.)

Castings Show—May 8-12, Brooks Hall, San Francisco, Calif. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Design Engineering Show — May 22-25, Cobo Hall, Detroit. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Tool Show—May 22-26, New York Coliseum, N. Y. (American Society of Tool & Mfg. Engineers, 10700 Puritan, Detroit 38, Mich.)

MEETINGS

APRIL

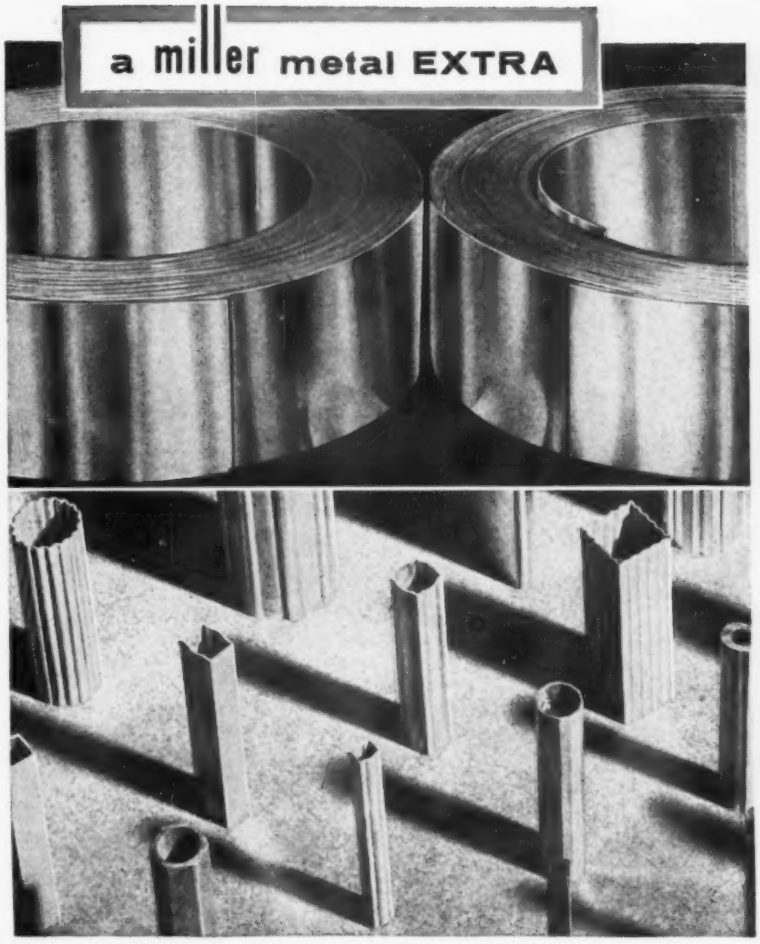
Drop Forging Assn.—Safety Conference, Apr. 21, Prince Edward Hotel, Windsor, Ontario. Assn. headquarters, 55 Public Square, Cleveland 13, Ohio.

American Welding Society—Annual meeting, Apr. 17-21, Commodore Hotel, New York. Society headquarters, 33 W. 39th St., New York 18, N. Y.

Scientific Apparatus Makers Assn.—Annual meeting, Apr. 23-27, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters, 20 N. Wacker Dr., Chicago.

International Acetylene Assn.—63rd anniversary convention, Apr. 24-25, Sheraton-Plaza Hotel, Boston. Association headquarters, 270 Park Ave., New York 17, N. Y.

(Continued on P. 28)



time saving, personal

ONE-SOURCE SERVICE

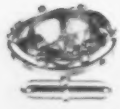
Your Miller sales representative—like all Miller men—offers you one-source service on brass, bronze and nickel-silver strip, and copper and copper-alloy tube in special shapes and sizes. Your Miller man is more than just a shopping center though, he's an expert on special metals and their application. He's backed up by people at the Miller mills who never regard their job as completed until your metal is in your plant, on your machines and satisfactory in every way. For meticulously produced high-grade metal, expert technical help and dependable delivery call on the specialists at Miller . . . where you're a name, not just a number on the job ticket.

ROLLING MILL DIVISION
Meriden, Connecticut

miller SINCE 1868

Tube Subsidiary
A. H. WELLS, INC.
Waterbury, Connecticut

vapor degreasing in Columbia-Southern Trichlor helps SWANK INC. set the quality pace, save on finishing costs



Natural topaz cuff link



Monogrammed tie clip and cuff link





Hand carved jade cuff link



Gleam of quality and appeal of unusual design characterize this selection of men's accessories from the Swank collection. Recent additions to the line include a full selection of small gift items and watches for men and women.

Attleboro, Massachusetts—Craftsmanship is a tradition in this New England jewelry center where Swank, Inc. produces its world-famous line of personal jewelry for men. Top quality in every price range demands care in manufacturing methods backed up with smart cost-control to keep them competitive. That's why vapor degreasing with such solvents as Columbia-Southern TRICHLOR was a natural to help Swank management meet the dual needs of effective cleaning at low cost.

Thousands of tiny parts made of all the decorative metals from brass and bronze to gold, silver, rhodium and others are buffed to a quality glow before final processing or protective plating. Since finish bespeaks quality in jewelry, no blemish-causing bits of soil could remain after the final cleaning step. The variety of metals to be processed, the tenacious buffing compounds to be removed without affecting the surface and the need for economy, gave the production department a real challenge.

Vapor degreasing was Swank's answer to the challenge. Taking advantage of modern equipment and the dependable quality of supplies like Columbia-Southern Trichlor with its heavy duty neutral stabilizing system, they were able to set up an efficient rate of continuous production without expensive shut down. Swank buys its Trichlor through Kraus Distributing Company of Providence, who also supplies other finishing materials.

A typical example of problem-solving teamwork between distributor and technical service from PPG's Chemical Division occurred recently which points up the value of well-informed suppliers. Swank was experiencing a mysterious build-up on the filters and distillation equipment which prevented proper operation of their large degreasing machine. A hurry-up call for help brought the distributor and the PPG representative. Sticking with the job until solved, they came up with the reason—an extra heavy load of insoluble spinning compound on parts being cleaned—and the solution, which involved adjusting the through-put rate and the method of work handling. Result: a return to production in a short time, with resultant savings.

Swank has found that Columbia-Southern Trichlor meets every test of quality and performance as a low-cost cleaning solvent in vapor degreasing. Trichlor is tailor-made for today's high production rates. It is produced under "Triple-check" quality control during manufacture for purity, uniformity and stability. This super-stabilized system helps protect your equipment from acid build-up. Finally, it is sold nationwide, through experienced distributors and backed up by qualified PPG Chemical Division technical service engineers. No wonder leaders like Swank of Attleboro look to Columbia-Southern Trichlor to keep them on target in efficiency and low cost.

For more details on vapor degreasing—the modern answer to metal cleaning—call your Trichlor distributor or our district office nearest you.

columbia | southern chemicals

CHEMICAL DIVISION

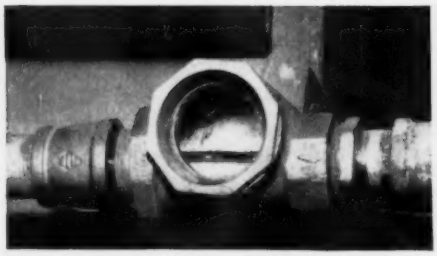
PITTSBURGH PLATE GLASS COMPANY

ONE GATEWAY CENTER PITTSBURGH 22, PENNSYLVANIA

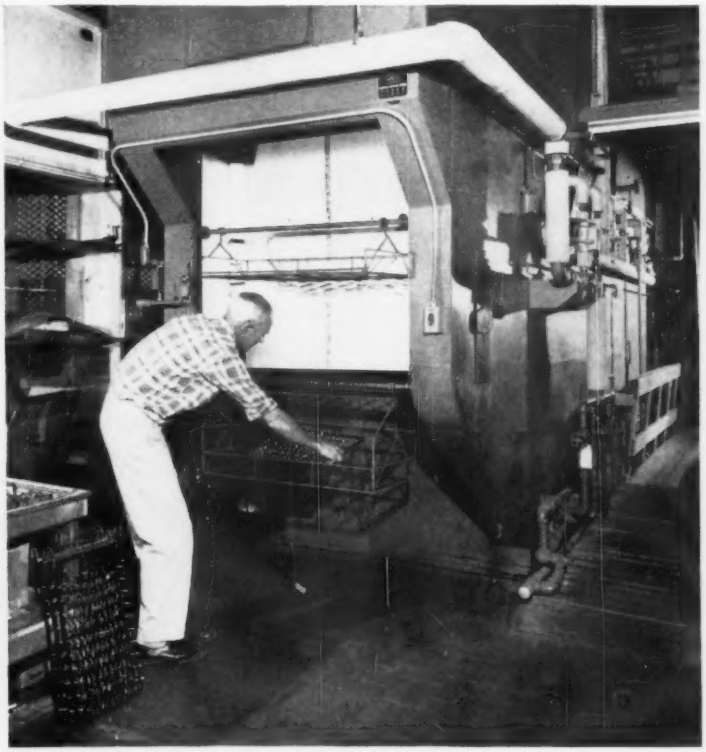
DISTRICT OFFICES: Boston · Charlotte · Chicago · Cincinnati · Cleveland Dallas · Houston · Minneapolis · New Orleans · New York · Philadelphia Pittsburgh · San Francisco · St. Louis · IN CANADA: Standard Chemical Limited



Bill Lovenbury of Swank and Martin Kraus of Kraus Distributing Company, Trichlor distributors, inspect a rack of belt buckles which are clean, dry and ready for final plating. Swank designed many of its own work-handling racks and baskets to insure complete exposure to solvent.

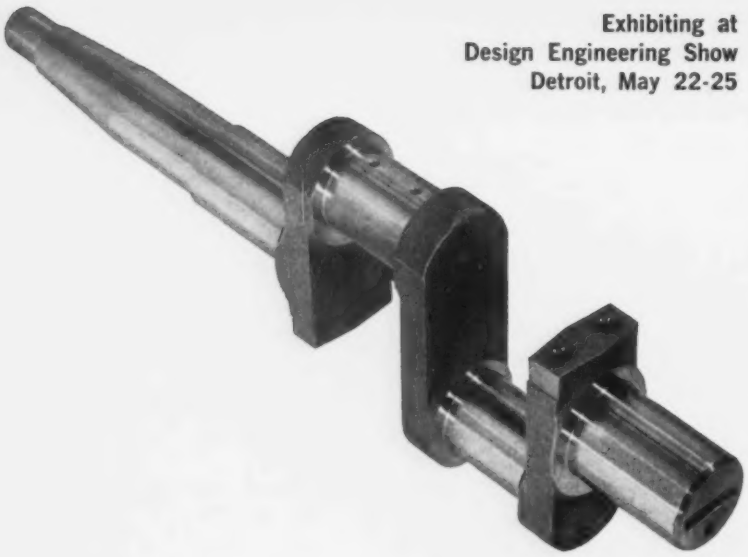


Clear Trichlor flows past the sight glass after distillation, ready for more cleaning mileage. Swank has improved costs with many ingenious modifications of equipment, and increased awareness of solvent use by metering the solvent supplied to every department.



Mechanized vapor degreasing machine charged with Trichlor meets Swank's need for high production and economy. Combination of liquid spray and vapor rinse gives superior results in short time. Return conveyor system simplifies handling (one man loads and unloads) and reduces solvent loss.

Exhibiting at
Design Engineering Show
Detroit, May 22-25



DUCTILE IRON SAVED MONEY

This seventy pound ductile iron crankshaft was made for air compressors manufactured by The Brunner Division of Dunham-Bush, Inc. The increased loads and impact resistance called for by new compressor design specifications required rigidity and strength beyond the limits of the cast iron alloy shafts formerly used. Ductile iron was chosen because the rigidity, yield strength and wear characteristics comfortably exceed operating requirements.

A major cost advantage was realized in this case. Hamilton Foundry used existing pattern equipment made for the gray iron crankshafts in the switch to ductile iron. This saved the cost of new foundry patterns and the greater cost of dies needed for steel forgings. Dunham-Bush achieved a major improvement in product performance for the modest additional cost of the metal in the castings.

When new and unusual design problems arise in the selection of metal and the casting of parts, you will find that the skill and integrity of your foundry is your best insurance that specifications—and delivery schedules —will be met.

GRAY IRON • ALLOYED IRON • MEEHANITE® • DUCTILE (NODULAR) IRON • NI-RESIST • DUCTILE NI-RESIST • NI-HARD

HAMILTON FOUNDRY INC.

1551 LINCOLN AVENUE • HAMILTON, OHIO • TWinbrook 5-7491

MEETINGS

(Continued from P. 25)

Assn. of Iron & Steel Engineers—Spring conference, Apr. 24-26, Jefferson Hotel, St. Louis, Mo. Association headquarters, 1010 Empire Bldg., Pittsburgh, Pa.

National Association of Secondary Material Industries, Inc. — Pacific Coast Div., regional dinner meeting, Apr. 25, Beverly-Hilton Hotel, Los Angeles, Calif. Assn. offices, 271 Madison Ave., New York 16, N. Y.

Institute of Radio Engineers—Annual conference, April 26, 27, and 28, Westward Ho Hotel, 618 North Central Ave., Phoenix, Arizona.

Society of the Plastics Industry, Inc. —18th annual western section conference, Apr. 26-28, Hotel del Coronado, Coronado, Calif. Society headquarters, 250 Park Ave., New York 17, N. Y.

National Screw Machine Products Assn.—Annual industry meeting, Apr. 30 - May 3, Somerset Hotel, Boston, Mass. Association headquarters, 2860 E. 130th St., Cleveland, O.

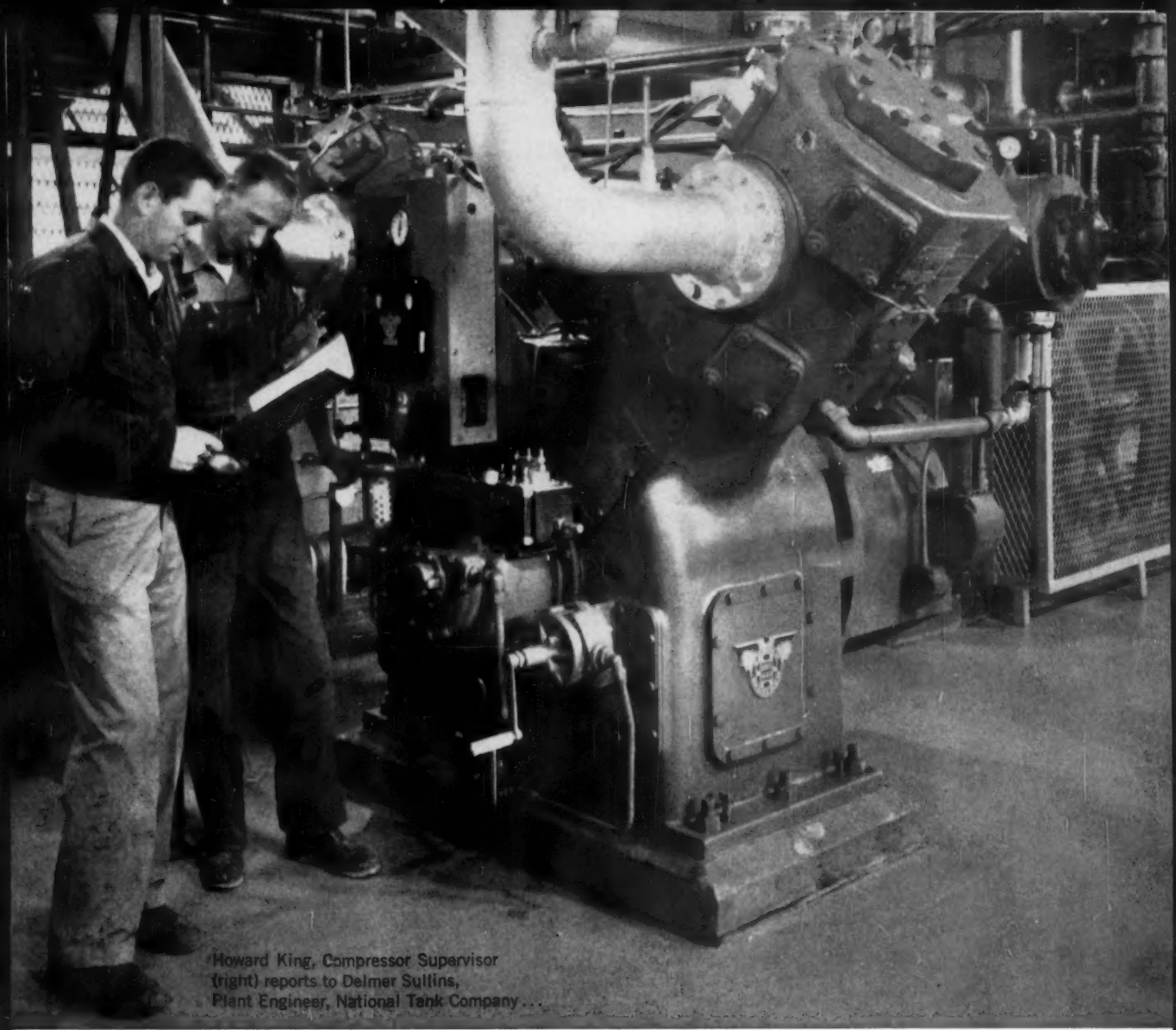
MAY

American Rocket Society — Oak Ridge National Laboratory, Space Nuclear Conference, May 3-5, Gatlinburg, Tenn.

National Machine Tool Builders Assn.—Spring Meeting, May 4-5, Edgewater Beach Hotel, Chicago. Assn. headquarters, 2139 Wisconsin Ave., N. W., Washington.

Ductile Iron Society—Annual Meeting, May 8-13, San Francisco. Society headquarters, P. O. Box 858, Cleveland.

American Foundrymen's Society—65th Castings Congress, May 8-12, San Francisco. Society headquarters, Golf and Wolf Roads, Des Plaines, Ill.



Howard King, Compressor Supervisor (right) reports to Delmer Sullins, Plant Engineer, National Tank Company...

"This new air compressor taught us what 'attention-free' really means"

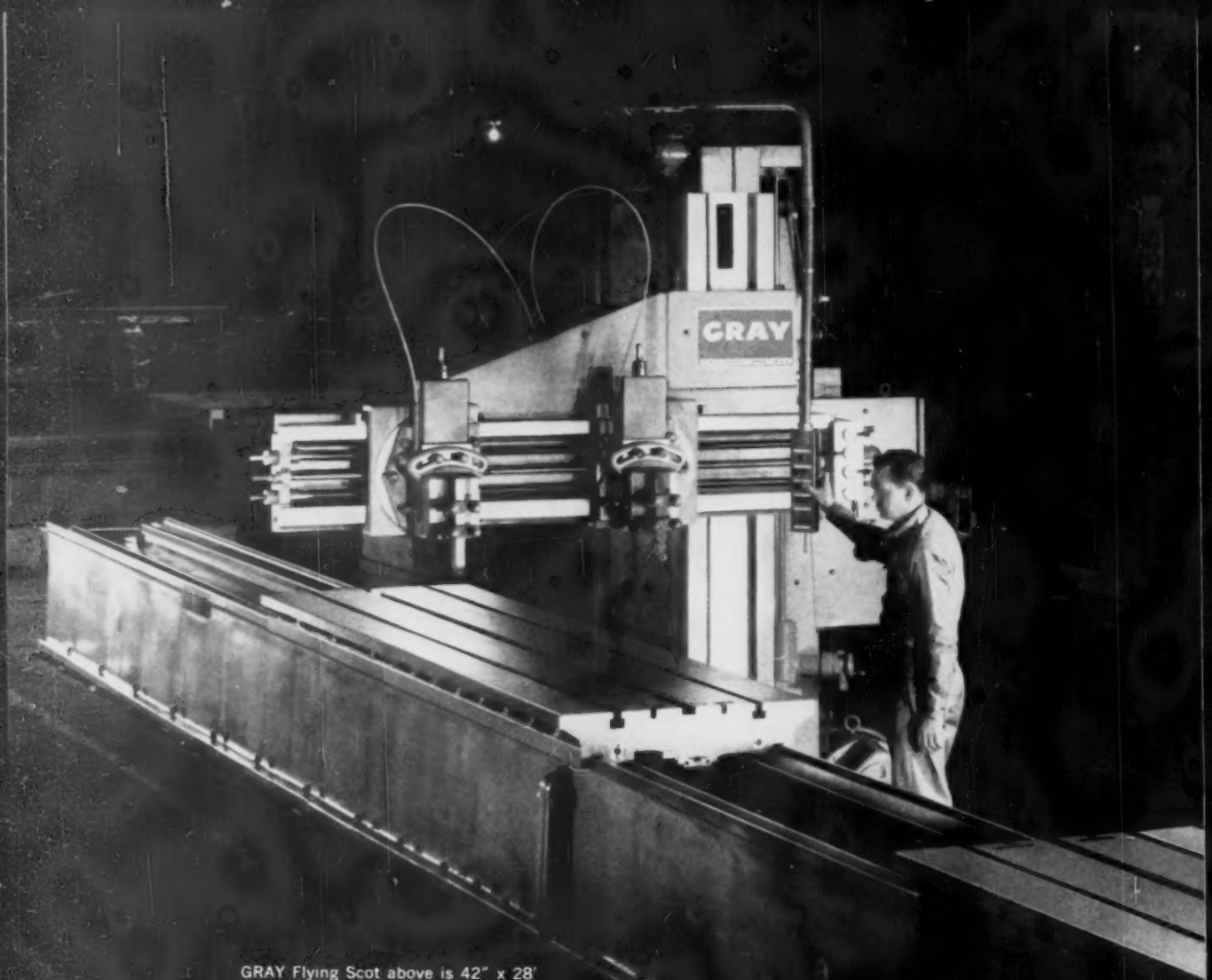
The Cooper-Bessemer DMR-2 Compressor shown was installed 7 months ago at National Tank Company, Tulsa. It has operated on a continuous schedule since then, delivering 757 cfm air at 125 psig pressure. According to Mr. Sullins, "This is really a reliable attention-free compressor. I like its automatic features and smooth performance."

When you plan compressed air facilities, it will pay you to investigate the new DMR line. These compact air compressors are completely equipped with integral motor-drive, inter-cooler and En Tronic control. Available for 500 to 2000 cfm. Write for Bulletin 94. Experienced engineers of Cooper-Bessemer will help you plan for optimum efficiency. Call our nearest office.

Cooper Bessemer

GENERAL OFFICES: MOUNT VERNON, OHIO

COMPRESSORS: RECIPROCATING AND CENTRIFUGAL
ENGINES: GAS - DIESEL - GAS DIESEL
JET-POWERED GAS TURBINES



GRAY Flying Scot above is 42" x 28'
with two rail heads
and special duplex table.



26 page Bulletin No. 73
on GRAY Flying Scot
available
on request

The G. A. Gray Co. / Cincinnati / Ohio /

What makes the $30,660* GRAY a best seller?

The 30"—36"—42" GRAY Flying Scot can lick any planer its size, in price or performance. It packs more value per dollar than any planer ever built. It is perfectly constructed, down to the smallest component, exactly like every Gray machine. It will perform — precisely — for years. Carbide planing up to 300 ft. per minute makes it the world's highest production small planer. Optional features, like double cutting and a duplex table, increase its productivity — and your hourly profit. Over (15) have been purchased since first introduced in May 1960.

*Basic price of 30" x 6' Flying Scot one rail head, electric drive, and controls.



horizontal milling and boring machines / planers / milling planers

USS Stainless Steel puts the gleam in the prospect's eye

Still standing head and shoulders above many newer ideas in selling today is an old truth—if a product "looks" better, it probably will sell better. This commercial virtue—*appearance*—is responsible for *first impressions*. And first impressions often determine which products move into use or remain in inventory.

If a good-looking product is well designed with a better material, it enjoys a marketing phenomenon—a competitive edge. This competitive edge is a tradition with Stainless Steel. For when the product goes to Stainless Steel, it goes first class. In fact, to lay it on the line, there is a deep respect for Stainless Steel that extends from skyscrapers to soup spoons.

There are those in the market place who know the value of the appearance and quality of a material. They will invest more—and more quickly. They appreciate the fundamental fact that appearance and quality are worth more. Compromise is alien to this metal. From its precisely controlled start in the electric furnace to its impervious finish, Stainless Steel awaits the imaginative designer who wisely employs its inherent qualities to turn prospects into buyers.

In brief, Stainless Steel delivers the edge for the key force—the salesman. Everyone prefers quality. And there's enough wisdom—and demand—in the market place to pay for it. We welcome a chance to work with you to create new products and establish new markets for products made from Stainless Steel. Write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

No other metal makes such a material difference in so many applications.



A beautiful building . . . it's Stainless

Number Four Gateway Center stands at the tip of Pittsburgh's Golden Triangle, a shining compliment to the City of Steel. And it will *keep* its mint-fresh beauty, because it's clad in Stainless Steel. This building is a 22-story reflection of the changing moods of the city around it. Any business firm would be proud to call Gateway Four home—and many already do, for it was substantially rented even before completion.



This Stainless trim has a job to do

If a car has Stainless Steel rub molding along the side, the owner is fortunate. This molding is tough, and its gleam can always be restored with the wipe of a cloth. This is quality in depth. It will stay bright and new-looking for the life of the car, too. In addition to adding a bright touch of beauty and quality, this Stainless molding does its primary job—fending off finish-scratching encounters with the careless—better than any other material.



You can tell a lot about a person by his luggage

The smart traveler carries luggage trimmed with Stainless Steel. A suitcase might get good care at home, but in the rough and tumble world of travel it is often subjected to bangs and bumps. Besides adding an extra touch of quality and beauty that catches the consumer's eye, Stainless trim will take lots of knockabout service and still stay undented because of its great strength.



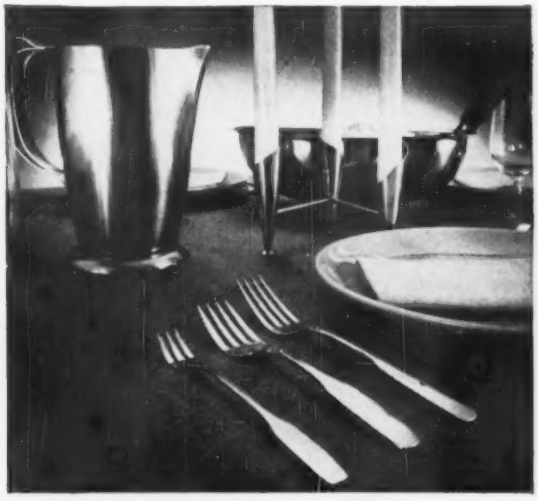
Stainless is for sitting on, too

Notice the modern design of the base of this office chair. It's made possible because Stainless is strong and can be fabricated into unusual shapes. It's a good example of what is possible when designers take full advantage of the unusual strength of Stainless Steel. Incidentally, this is a good example of "component" design. This same type of base can also be used as the pedestals for desks or tables.



Men like Stainless at home...

Stainless Steel brightens up leisure moments. Take this home bar, for instance. It's equipped with stirrers, shakers, openers, ice crushers, strainers, etc., all made of Stainless Steel; and all are beautiful as well as functional. Because they're Stainless, they have the permanent gleam of beauty and quality.



...and so do their wives

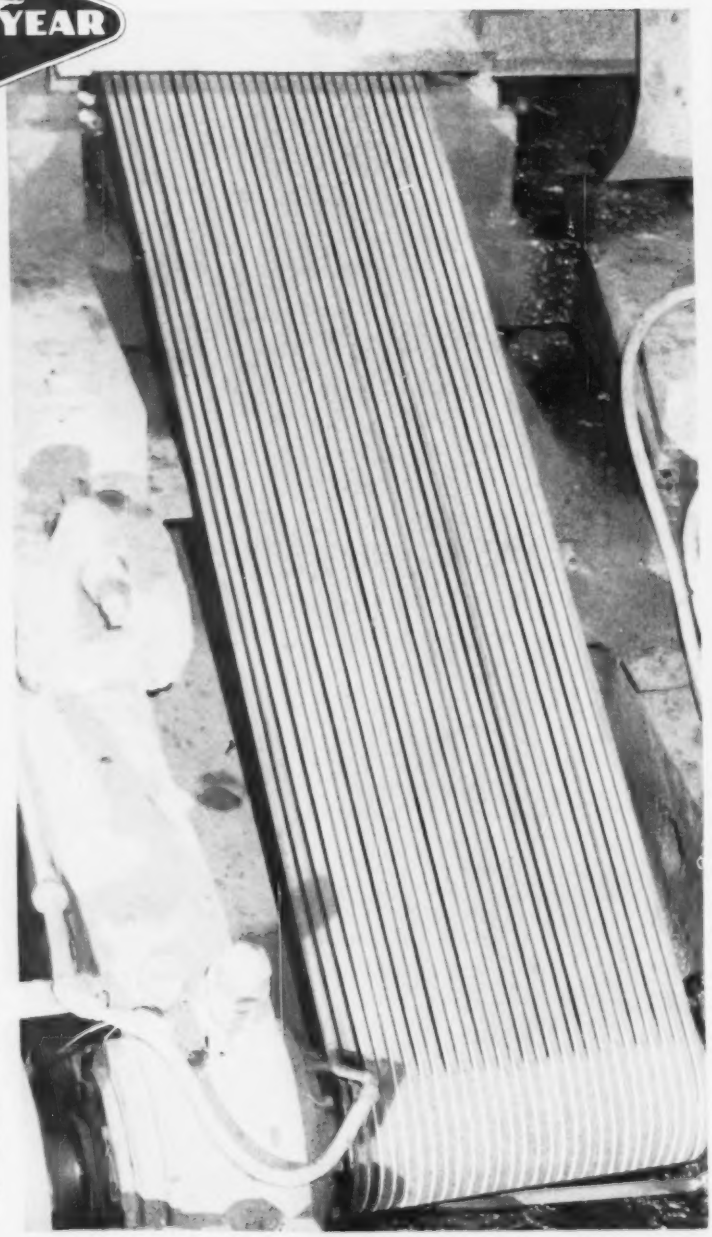
In the kitchen and in the dining room Stainless Steel makes a woman's world a more attractive, practical place. She can set a formal table with Stainless—graceful flatware, gleaming pitchers, candelabra and many other decorative items. Cooking is clean with Stainless Steel utensils that stay smooth, shiny, and stainfree. That's why Stainless is used in the better restaurant kitchens—and in the better home kitchens, too.

USS TRADEMARK **United States Steel**

GOODYEAR EXCLUSIVE! IS YOUR SIGN OF V-



Goodyear V-Belts' precision matching comes from this exclusive close-tolerance matching equipment that length-codes each belt to 1/32". Most other belt manufacturers code only to 1/10".



Goodyear V-Belts' precision matching assures standout performance. Example: only 28 COMPASS-V-Steel Belts handle this big steel saw, normally calling for 42 belts. Result: the steel mill saved $500 at the original installation – will save more at every belt change.

THE GREEN SEAL BELTS CODED TO 1/32"



Here's your assurance that every belt in a set matches in length – pulls together for maximum trouble-free horsepower hours

What's more, the Green Seal means –

Dimensional stability that lasts the life of the belt–thanks to shrink- and stretch-resistant "muscles" of 3-T Process Cord or airplane-type steel cable built into each belt.

Satisfactory performance even when subjected to dampness – because of special mildew-inhibited compounds.

The most complete line of V-Belts anywhere today – always within easy reach through a nationwide network of distributor stocks.

The proper selection of V-Belts to meet your requirements with the help of the G.T.M.– Goodyear Technical Man – America's top belting specialist.

So make the GREEN SEAL your sign of savings–in both time and money–by calling your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

Lots of good things come from

GOODYEAR

INDUSTRIAL PRODUCTS

Green Seal, Compass–T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio



FROM DESIGN TO DELIVERY, YOUR QUALITY SERVICE SOURCE OF BERYLLIUM METAL, ALLOYS AND OXIDE

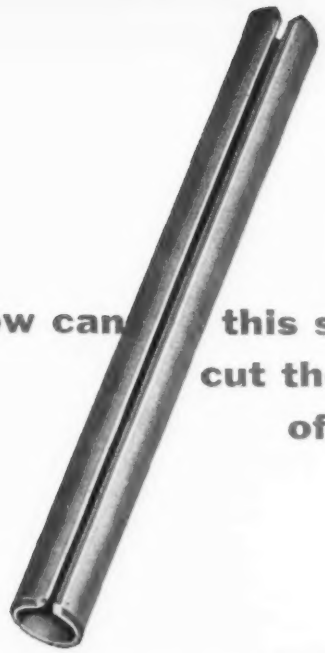
Beryllium in any form brings you extra advantages when it comes from BERYLCO. In addition to the unique combination of design and performance properties inherent in the metal itself, you can be certain of quality and uniformity that will show immediate dividends when you go into production. And BERYLCO's beryllium experts are standing by, when and where you need them, with any technical assistance you may want in developing your application.

Twenty distributors blanketing the U.S. and Canada assure you of a nearby delivery source of pure beryllium copper strip, wire, bar, rod and extrusions. The answer to many of your problems is here . . . a unique metal and alloys, outstanding technical assistance, dependable delivery. Write today for the address of your nearest distributor.

BERYLCO®

THE BERYLLIUM CORPORATION

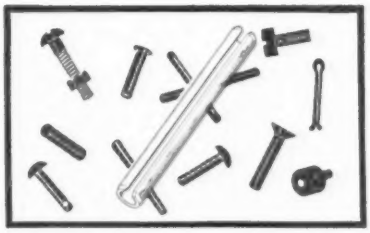
P. O. Box 1462, Reading, Pennsylvania • Phone WAlker 9-0781



How can this simple fastener cut the cost of your product?

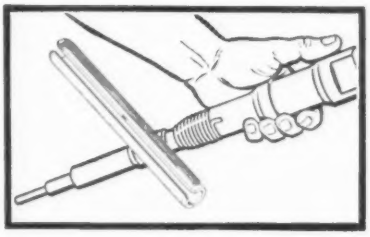
Rollpin aids standardization and reduces inventory

Rollpin readily replaces taper pins, grooved pins, straight pins and set screws; it can be used as a locating dowel, hinge pin, cotter pin, stop pin or, in some applications, even as a rivet. Thus, when you standardize on a Rollpin you can drastically reduce the variety of fasteners in your inventory—save money in purchasing, storage space and stock handling.



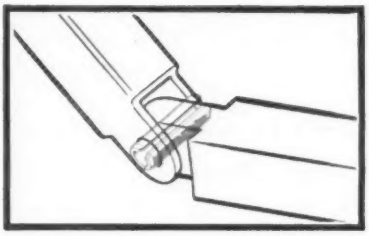
Rollpin simplifies production processing . . . saves man-hours

When you use Rollpin you can eliminate costly precision drilling, or tapping operations. And there's no need for any secondary locking operation—such as lock wiring or peening. That's because Rollpin is a slotted tubular steel spring whose chamfered ends drive easily into standard production-drilled holes, compressing as driven. The spring tension against the hole walls retains Rollpins securely against severe vibration. Independent studies have shown that installed costs of Rollpin are as much as *91% less* than those for a dowel pin or *95% less* than the installed cost of a taper pin.



Rollpin simplifies product maintenance

Only a drift pin or standard punch is required to remove a Rollpin. The slotted tubular shape and the spring action principle do not damage hole walls or enlarge the original hole diameter. Consequently the same pin is easily re-inserted and can be used again and again. Mail our coupon today for the complete Rollpin story.



ROLLPIN®

a product of
Elastic Stop Nut Corporation of America

Dept. R58-477 Elastic Stop Nut
Corporation of America
2330 Vauxhall Road
Union, New Jersey

Please send the following free fastening information

- ☐ Rollpin bulletin
- ☐ ELASTIC STOP® nut bulletin
- ☐ Here is a sketch of a fastening problem. What ESNA® fastener would you recommend?

Name_____

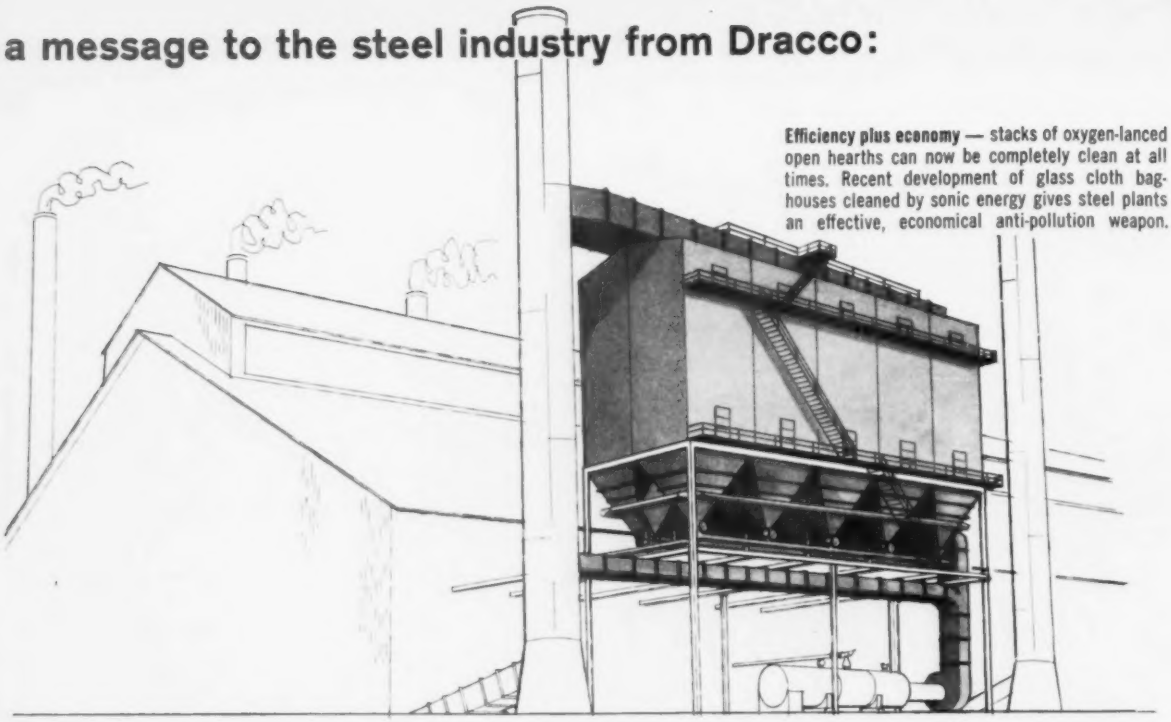
Title_____

Firm_____

Street_____

City_____ Zone____ State____

a message to the steel industry from Dracco:



Efficiency plus economy — stacks of oxygen-lanced open hearths can now be completely clean at all times. Recent development of glass cloth baghouses cleaned by sonic energy gives steel plants an effective, economical anti-pollution weapon.

AIR POLLUTION CONTROL FOR OXYGEN-LANCED OPEN HEARTHS NOW COSTS LESS!

Dracco Glass-Bag Filters with patented sonic cleaning now offer the steel industry a practical solution to open hearth furnace gas cleaning. Under all operating conditions, they assure full-time, uniform high-efficiency collection at lower cost. Here are the facts:

• **Lower capital investment** can mean 33⅓ to 50% savings compared to less efficient, more costly devices currently used.

• **Lower maintenance costs**—including cost of infrequent bag replacements—can be realized. The reasons: (1) gas conditioning, with associated corrosion, is eliminated, (2) unskilled maintenance labor can be used, (3) no internal moving parts, (4) no acid mists deposited inside unit, (5) no elaborate seals or insulators, (6) no costly accessories—converters, transformers, controls, (7) long bag life—no severe flexing.

• **Extremely high efficiency** stays high at all times, regardless of fluctuations in dust and furnace conditions. Discharge free of visible solids can mean a clean stack for your plant.

• **Broad temperature operation** up to 600° F. is permissible with fiber glass bags. No cooling required when waste heat boiler is used.

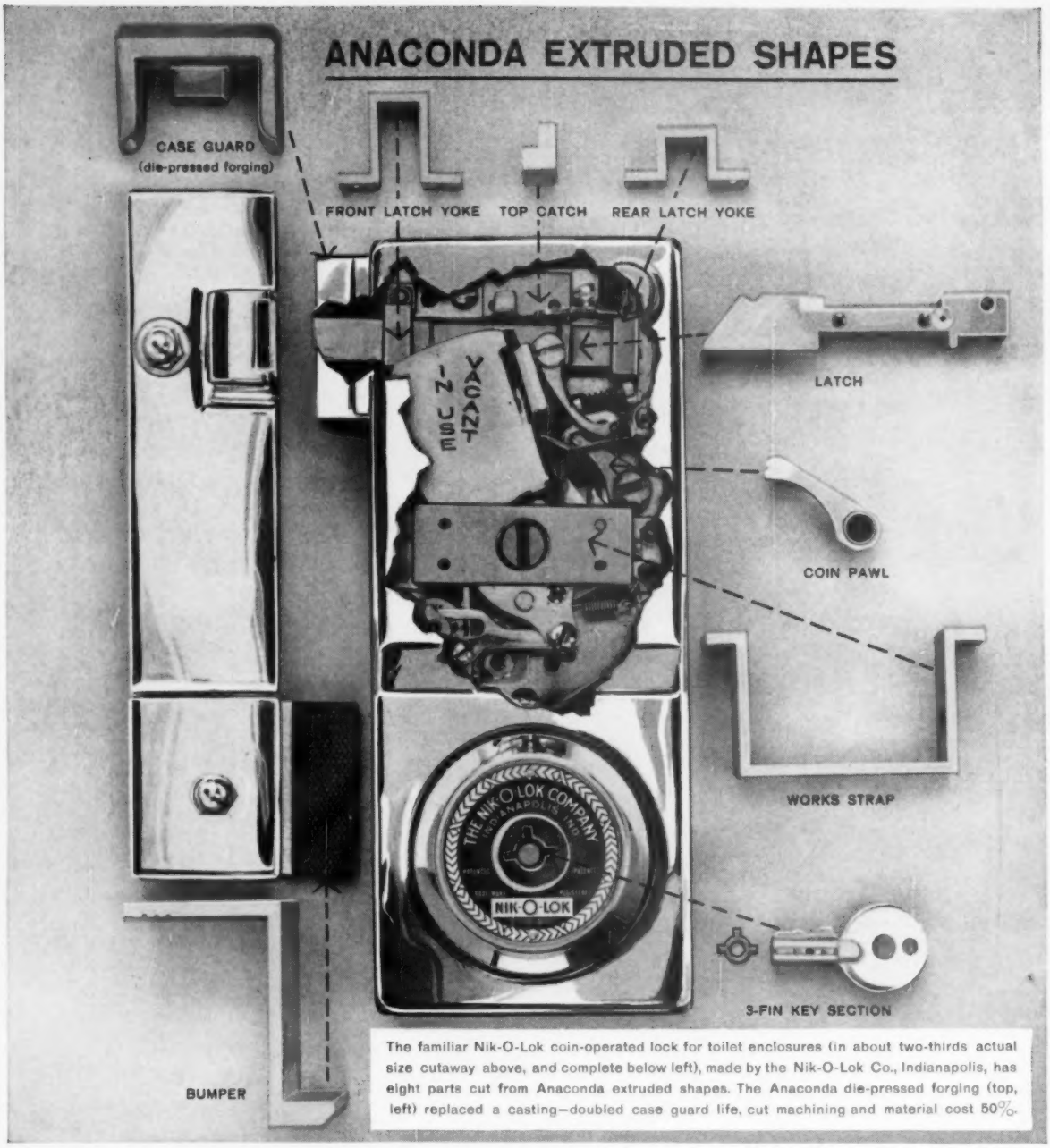
• **Sonic cleaning — a must for open hearth dust and fume**—effectively removes accumulated particles from filter bags. Dracco offers patented apparatus insuring low back pressure and long bag life.

• **Built-in flexibility** counterbalances space requirements, permits use with any furnace, gas cooling method or materials handling system.

Rugged Dracco glass cloth baghouses can be custom engineered to give your plant clean stacks and better community relations. And you will be working with a firm having over 40 years experience in licking the toughest air pollution problems. For full details or expert consultation, contact: Dracco Division of Fuller Co., Harvard Avenue and East 116th St., Cleveland 5, Ohio.

DRACCO *airstream* conveyors
dust control equipment

FULLER COMPANY



The familiar Nik-O-Lok coin-operated lock for toilet enclosures (in about two-thirds actual size cutaway above, and complete below left), made by the Nik-O-Lok Co., Indianapolis, has eight parts cut from Anaconda extruded shapes. The Anaconda die-pressed forging (top, left) replaced a casting—doubled case guard life, cut machining and material cost 50%.



How parts sliced from long lengths of "premachined" brass shapes cut costs. It starts in design. You select cross sections which minimize subsequent machining—and scrap. The only limitation is that grooves, slots, etc., must parallel the axis of the extruded bar. The smooth surface of extruded shapes reduces many finishing operations. And high dimensional accuracy simplifies assembly. In addition, you get superior, long-wearing parts that improve the quality of your product, because of the strong, homogeneous wrought-metal structure of extruded shapes. For imaginative and practical help in adapting extruded shapes to the economical production of intricate parts, see your Anaconda representative. Or write: Anaconda American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

6143 ANACONDA®

Ore importers... save money via Portland (Oregon) Harbor

Big savings by faster discharging of ores and ore concentrates await importers... on completion of Portland Public Docks' giant new bulk unloader later this year. With a rated capacity of 900 tons-an-hour, this straight-line bulk unloader will give Portland Harbor the only facility of its kind on the Pacific Coast... making terrific savings for bulk importers.

- only bulk discharging plant of its kind on the Pacific Coast!
- rated capacity 900 tons-an-hour!
- direct transfer from ship to rail or truck!
- 140-car rail yard!
- open storage area!
- cargo shed!
- will handle all types of vessels... all types of dry bulk cargoes!



PORTLAND PUBLIC DOCKS

Operated by the Commission of Public Docks
3070 N. W. Front Ave. Portland 10, Oregon
TWX • PD309U

ORE IMPORTERS TAKE NOTE!
For detailed information on how Portland Harbor's new bulk unloader can cut your importing costs write:

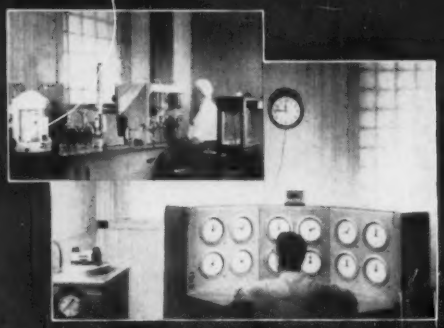
Sales-Traffic Department
Portland Public Docks

Eastern Representative: Buckley & Co., 170 Broadway New York 38, N. Y.

. . . add our manpower to this picture



Your orders are processed and expedited from this general office and plant administration building.



Metallurgical quality control with complete modern testing methods precedes and follows every job from order entry to shipping dock.



Electric furnace steel poured to the vacuum stream degassing chambers meets the most critical specifications for steel components.



The 3000 ton "squeeze" starts a 90 inch x 120 ton ingot on its way to become a forged steel turbine rotor, a diesel crankshaft, a ship's drive shafting.



Steel Castings to 400,000 # are pulled from the sand in these new modern foundries.



Modern facilities in our 260,000 square feet of machine shops serve our steel foundries and forge shops.

✳ STEEL FORGINGS FOR...

- Diesel Crankshafts
- Connecting Rods
- Ship's Shafting
- Turbine Rotors
- Bending Rolls
- Rolling Mills
- Industrial Presses
- Steam Hammers

✳ STEEL CASTINGS FOR...

- Steam Hammers
- Ship's Components
- Rolling Mills
- Industrial Presses
- Turbines
- Hydro-electric Engines
- Crushers
- Cement Plant Equipment

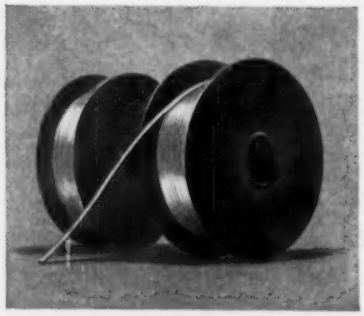
Ingots for manufacturers who do not make their own steel.

ERIE FORGE & STEEL CORPORATION

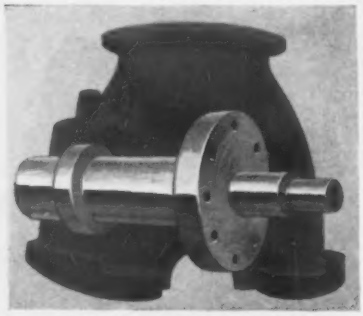
ERIE, PENNSYLVANIA

A simple, effective, low cost rust and corrosion control that . . .

- *is easy to apply*
- *eliminates moisture*
- *prevents corrosion*
- *need not be removed*



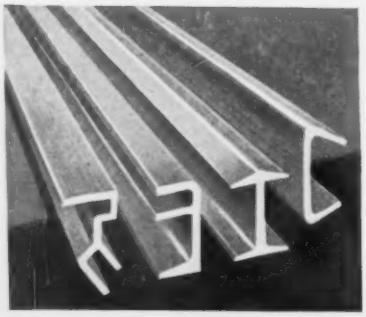
CRC 3-36 has a dual action which first removes moisture from the surface, driving it out of grain boundaries, cracks and pores. It then forms a thin molecular film of approximately 2 microns over the surface and seals it against subsequent deposits of moisture and the action of corrosive atmospheres.



For Castings & Large Machined Parts

A steam turbine manufacturer, after exhaustive tests, now uses CRC 3-36 exclusively to protect metallic surfaces of parts and equipment in various stages of manufacture from deterioration due to corrosion. After standardizing on CRC 3-36, the necessity for stocking, coding and handling a wide variety of products was eliminated. In addition, CRC 3-36 does not have to be removed before subsequent processing. Substantial savings are being realized through the use of CRC 3-36.

This manufacturer has also found that CRC 3-36 will protect all metallic surfaces from rust and corrosion during shipment.



For Extruded Aluminum

An aluminum manufacturer received complaints that bright aluminum extrusions arrived at distribution points covered with a dull coating of oxide. Exhaustive tests under actual shipping conditions show that an inexpensive coating of CRC 3-36 eliminated oxidation during shipment and that distributors, in turn, could ship bright and shining extrusions months later to customers with no complaints about oxidation. Furthermore the extrusions were ready-to-use as CRC 3-36 does not have to be removed.

For Manufacturing Processes

The manufacture of welding wire poses a corrosion problem from coolants used to lubricate and cool dies used in the rolling or drawing process. One manufacturer of welding wire tried applying CRC 3-36 before running the stock through the mill and obtained excellent results. Now all stock is coated with CRC 3-36—corrosion is controlled and no stocks are lost due to rust.

New! CRC Soft-Seal for Severe Conditions

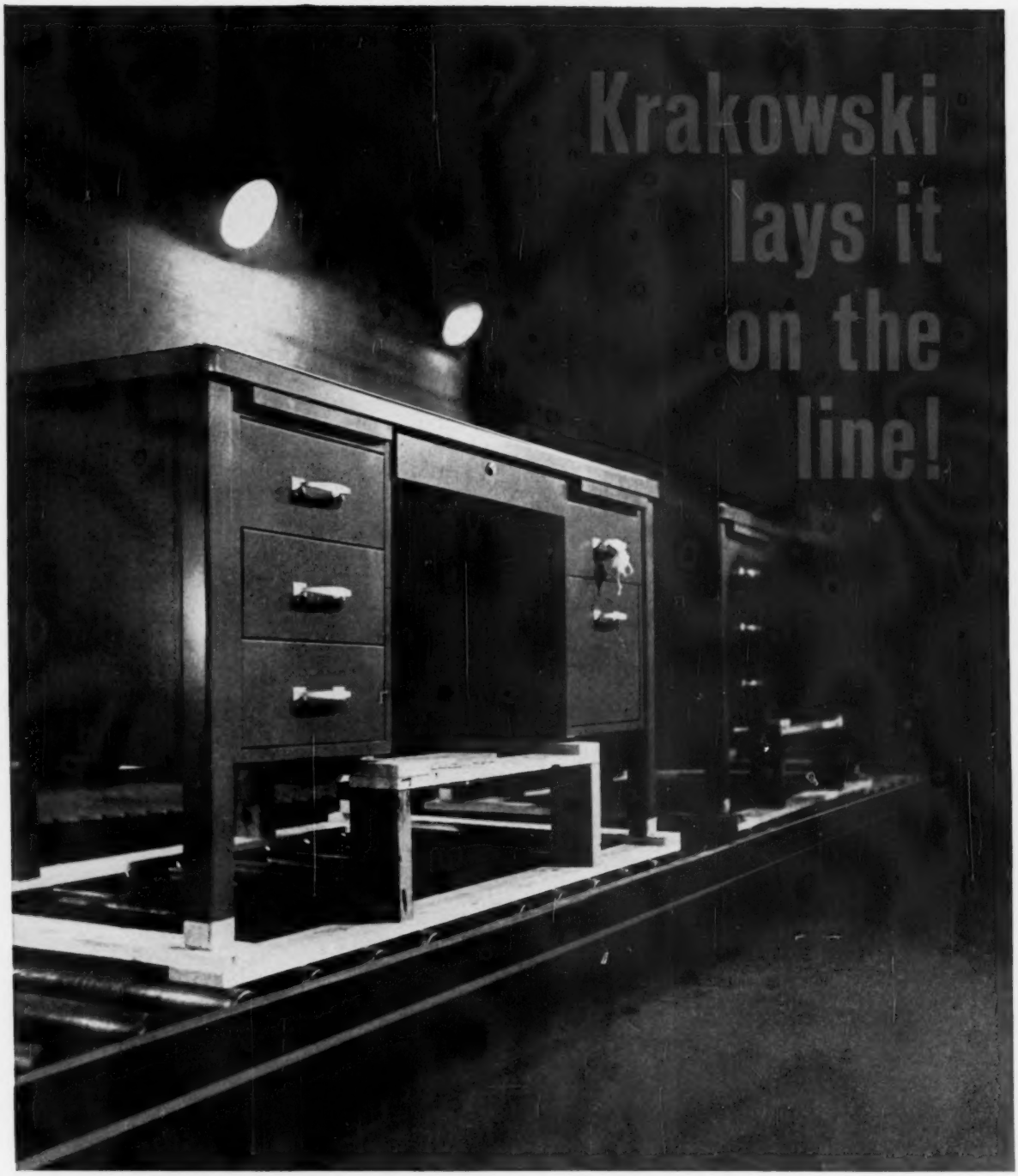
If you are using expensive interior storage space for metal stocks, dies, jigs and fixtures, these may be coated with Soft-Seal and stored outside to release inside space for productive use.

For further information, write to
Corrosion Reaction Consultants,
A SUBSIDIARY OF
THE CHAS. J. WEBB SONS CO., INC.
116-3A Chestnut Street, Phila. 6, Pa.,
or telephone WAlnut 5-0200.

CRC FORMULA 3·36 METALS INDUSTRY

Metal Protection for
MANUFACTURING • STORAGE • PACKAGING

Ask your local industrial distributor for a trial supply.



Lou Krakowski, General Superintendent of the Harrison Sheet Steel Company, is a guy who makes no bones about what he wants. It's service! And, for twenty years, he has been getting what he considers the best . . . Cities Service.

Turning out, among many other things, 125 steel desks a day, he wants complete and dependable lubrication service. One of the many Cities Service products he uses to get this job done is Trojan H-2 grease. For general greasing on all equipment, multi-purpose Trojan H grease has a wide range of application. And, because of the variety of jobs Trojan H grease does, it reduces his necessary lubrication stocks.

If you have to *get it on the line* . . . call your nearest Cities Service office . . . or write Cities Service Oil Company, 60 Wall Street, New York 5, N. Y.

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QUALITY PETROLEUM PRODUCTS

Better products, *faster*, from your National Seal distributor:



This is no surprise package

When you open a box of National Oil Seals, you know exactly what to expect . . . a quality product. Micro-Torc® leather and Syntech rubber seals are results of the finest engineering, design and testing techniques. They protect bearings better and longer.

To keep machinery running smoothly, replace used seals with new National Oil Seals. Your bearing specialist will help you set up a service stock with the right seals to keep your standby inventory in balance. (National Oil Seals are phosphate coated to protect against rust and corrosion while in the crib or shelf.) Call him today.

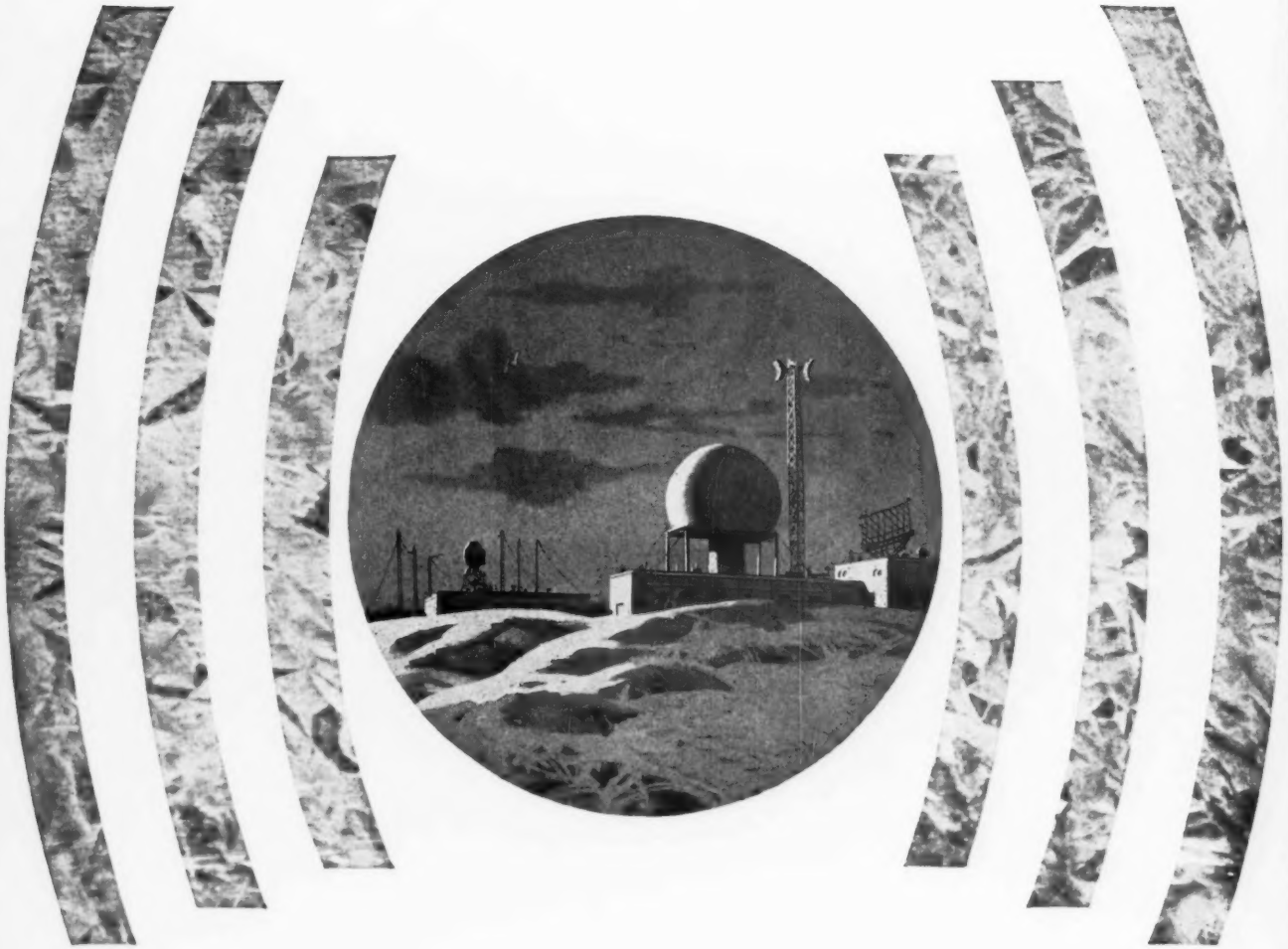


NATIONAL OIL SEALS

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN

U.S. Air Force DEW-Line buildings fend off corrosion . . .



GUARDED BY GALVANIZED STEEL

Galvanized steel sheets—over 300 tons—will fill a vital need in the construction of unique air terminal/storage buildings for our Air Force's DEW (Distant Early Warning) Line.

The need? Maximum strength plus a defense against the DEW Line's dew point. Based north of the Arctic Circle, these buildings and their interior warmth will abut against bitter outside cold to create a temperature differential up to 130°—and a condensation-corrosion threat as extreme as the –60° surroundings. To eliminate the threat, each building will consist of: insulated galvanized steel floor construction, galvanized steel for outer skin of sidewalls, galvanized steel for inside (vapor barrier) face of sidewalls.

WEIRKOTE® IN PARTICULAR! To the inherent strength, economy and versatility of steel, Weirkote adds enduring zinc protection via the modern continuous process. As a result, Weirkote galvanized steel can be worked to the very limits of the steel base without chipping or peeling. And it assures you of long-lasting protection against corrosion. It is manufactured by two National Steel divisions, Weirton Steel and Midwest Steel. Write Weirton Steel Company, Weirton, West Virginia, for further details.

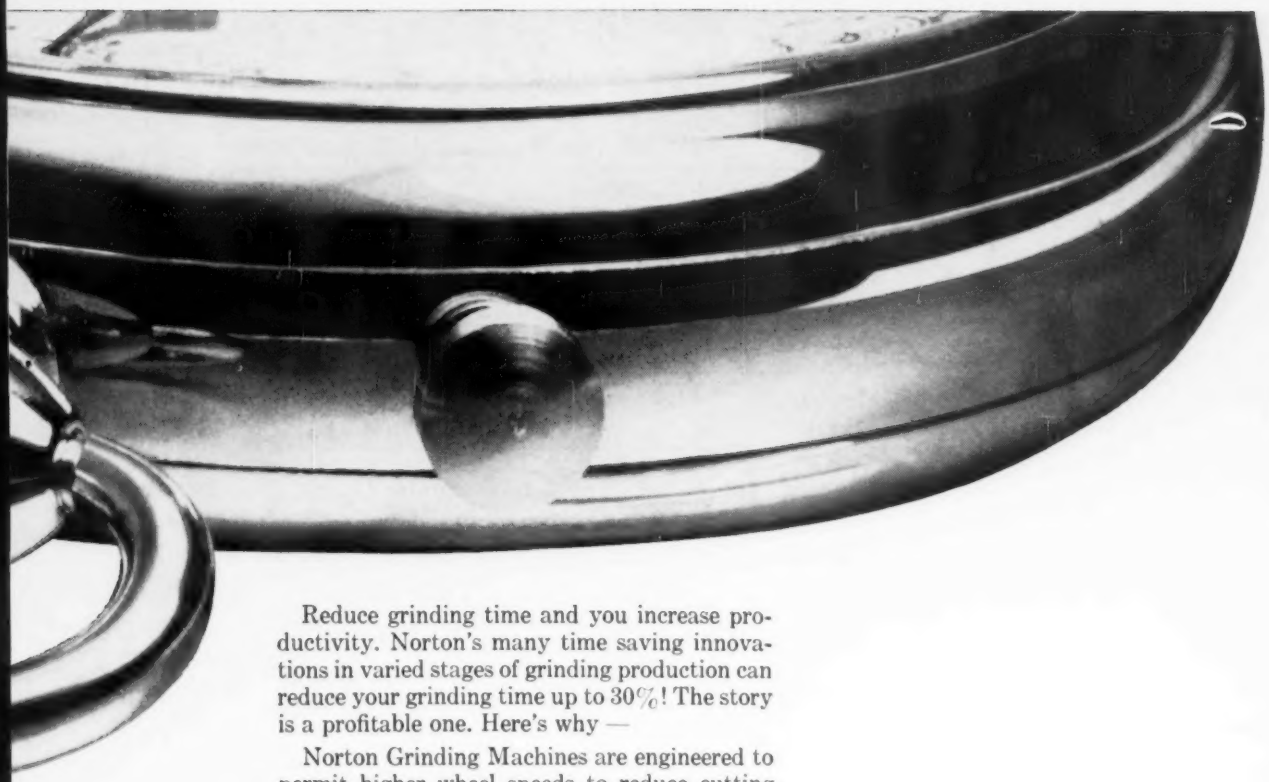
MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia

divisions of
NATIONAL STEEL CORPORATION



Time is the measure of productivity



Reduce grinding time and you increase productivity. Norton's many time saving innovations in varied stages of grinding production can reduce your grinding time up to 30%! The story is a profitable one. Here's why —

Norton Grinding Machines are engineered to permit higher wheel speeds to reduce cutting time. Norton's *Automatic Wheel Balancer* balances the wheel in *five seconds — on the machine.* You reduce time spent "grinding air" up to 85% because of Norton's *Automatic Wheel Contact Accelerator* which speeds the wheel to the work and compensates for work piece-diameter variation. Another advance is Norton's *Automatic Truing* which eliminates work interruptions and the *Automatic Wheel Wear Compensator* that stabilizes the grinding cycle.

Norton Grinders further add to your productivity by minimizing work spoilage with *Automatic In-Process Gaging.* In the case of surface grinders Norton *Higher Table Speed of 150 fpm* actually reduces grinding time up to 50%.

These are only some of the many reasons you can increase your productivity with Norton Grinders. They also offer accessories that literally transfer skills to machines — *ultra-fine feed*, and *automatic features* such as *steady resting, endwise locating, loading, constant peripheral wheel speed* and *hydraulically-operated feed screws* provide this competitive advantage.

The decision is yours — can you afford not to reduce the time it takes to produce your product? Can you afford not to increase your productivity? Contact your Norton man, NORTON COMPANY, Machine Tool Division, Worcester 6, Mass. District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. In Canada: J. H. Ryder Machinery Co. Ltd., Toronto 5.

NORTON
MACHINE TOOLS
... Making better products to make your products better

MACHINE TOOL DIVISION: Grinding and Lapping Machines — **G & E DIVISION:** Shapers • Gear Cutting Machines

"We had three carload returns of sheet last month, Harry. Bad surface. Cut-length rejections are killing us, too. 4.1% breakage."

"Well, Metallurgy has been telling me Foote Electromanganese will give us a better surface, more ductility. Reduce silicon and carbon pickup to practically zero."

"Hold it. Some of you guys don't seem to care what electrolytic manganese will do to my ingot cost."

"I'm with you, Sam. But I hear Foote claims that they can help quality and still cut the shipped cost of steel. I've got a stake in this. Let's let 'em prove it."

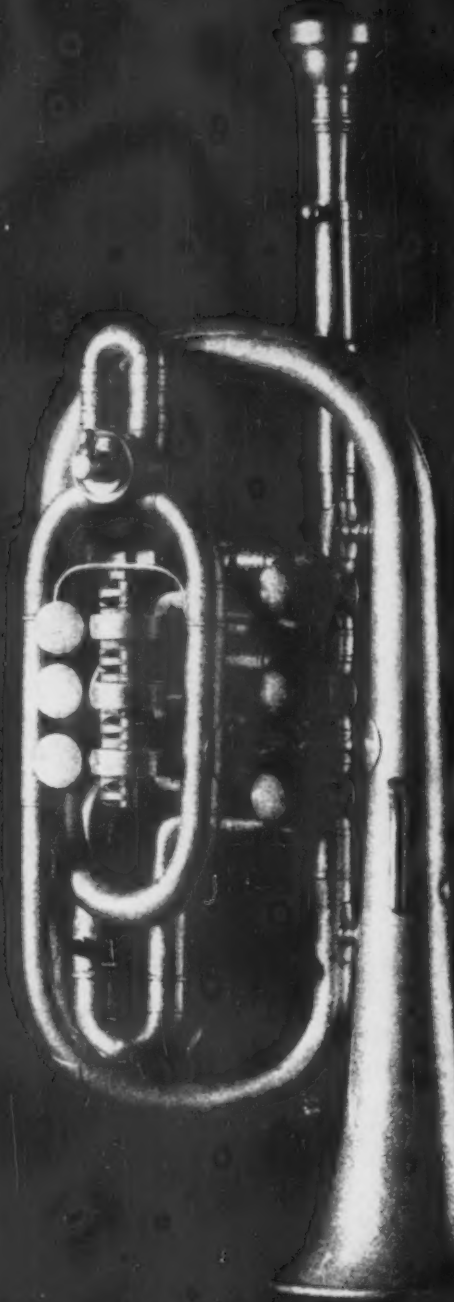


We'd be glad to! . . . We'll show you how Foote Electromanganese® can help control the cost of steel from pouring platform to loading platform. Yes, the cost of ingot may go up. But after this initial investment in quality, costs tumble. Electromanganese increases ductility. Rolling properties are improved, annealing cycle can be shortened. The secret is a simple one. Foote Electromanganese is pure manganese—99.9% pure. Carbon, phosphorus, silicon are almost not there at all. You make cleaner steels. Reject rate drops—so you sell more of what you make. And when your steel is shipped, returns are way down, breakage claims way down. Steels made with Electromanganese lead from strength, give you a better break on profits.

We will also make available to you a Foote expert—free. He'll assist in every way possible. Get in touch with your Foote representative—today, and write for your copy of Bulletin 201 which describes all the benefits in using Electromanganese. Foote Mineral Company, 438 West Chelten Avenue, Philadelphia 44, Pennsylvania.

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A
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We're awake to your inventory problems

... and can solve them quickly, by supplying the aluminum you need on short notice. Use us as your stock warehouse. Kaiser Aluminum Distributors supply aluminum quickly cut to your size requirements on special equipment. You'll save space. Save inventory cost. Give us a call!

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LU 5-0101

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WH 8-1661

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Fullerton Metals Co.
HU 1-6900
Lewis Steel & Aluminum Co., Inc.
EV 4-6000

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Fullerton Metals Co.
ST 1-3456
Korhumel Steel & Aluminum Co.
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United States Steel Corp.
MI 6-7311

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T. E. Conklin Brass & Copper Co., Inc.
WA 5-7500
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CH 3-4455
David Smith Steel Co., Inc.
GE 9-5600
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AT 1830

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United States Steel Corp.
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Delta Metals, Inc.
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Chase Brass & Copper Co.
JU 3-4994
Earle M. Jorgensen Co.
MI 7-7800
U. S. Steel Supply Div.—
United States Steel Corp.
MA 1-4988

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Eagle Metals Co.
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Earle M. Jorgensen Co.
MU 2-7910
U. S. Steel Supply Div.—
United States Steel Corp.
MA 3-3014

SHREVEPORT, LOUISIANA
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UN 5-4241

SOUTHINGTON, CONNECTICUT
Zurbach Aluminum Co.
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FR 1-0212
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JE 5-0440

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NEW LEADERSHIP IN THE WORLD OF ALUMINUM



Adjustable From 1 to 15 Seconds

This new Allen-Bradley development should solve such occasional problems where, upon the operation of the push button or limit switch, a slight time delay should occur. Time delay is adjustable up to 15 seconds—and it can also be introduced when "stopping" the operation—but not in both the "starting" and "stopping" cycle.

Both push-button and limit switch are relatively low in cost—ideal for applications where a delay of only a few seconds is desired, and where the repetitive accuracy of the Allen-Bradley Bulletin 849 time delay relay is not necessary. Both units have single pole, double break contacts—either normally open or normally closed. They are no more difficult to install than the corresponding units without the time delay feature.

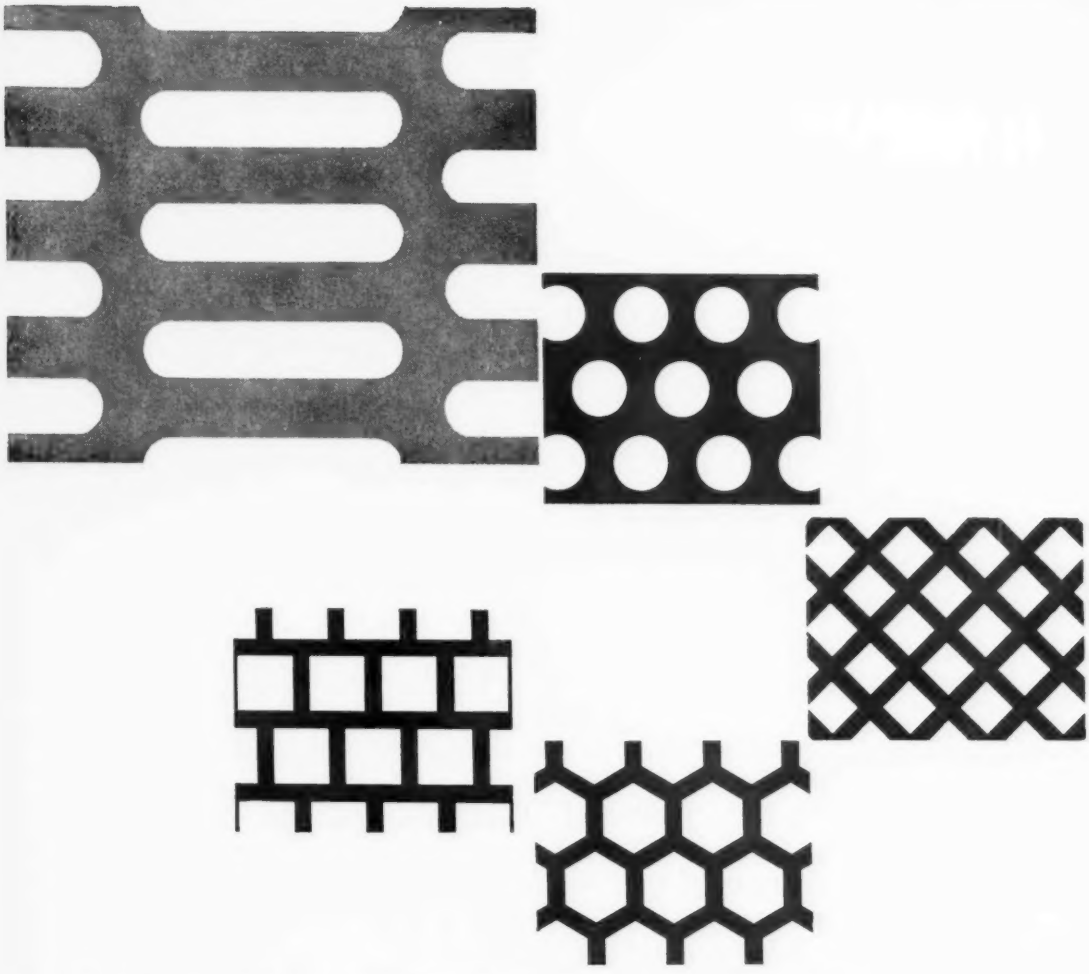
Machine tool and production system designers should have full information in their files on these new Allen-Bradley time delay push buttons and limit switches. It is yours for the asking. Write today.

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Allen-Bradley Co., 1341 S. First St., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

QUALITY MOTOR CONTROL



put an extra plus in new products... HENDRICK perforated metal

Metalworking fabricators well know the importance of adding to product appearance **while the product is in the design stage.** That's why so many design engineers come to Hendrick for advice. Hendrick's vast stock of dies and perforating experience are invaluable aids to manufacturers planning new design application and product development.

Hendrick perforated metals are available in a wide variety of patterns in every commercially rolled metal. Hendrick also perforates masonite, rubber, plastic and insulated board. Each can be supplied in a large number of sizes in plain or panel effects. Hendrick perforated metal is available in round, hexagon, square, slot and diamond openings. Mail the coupon for more information.

HENDRICK Manufacturing Co.
Carbondale, Penna.

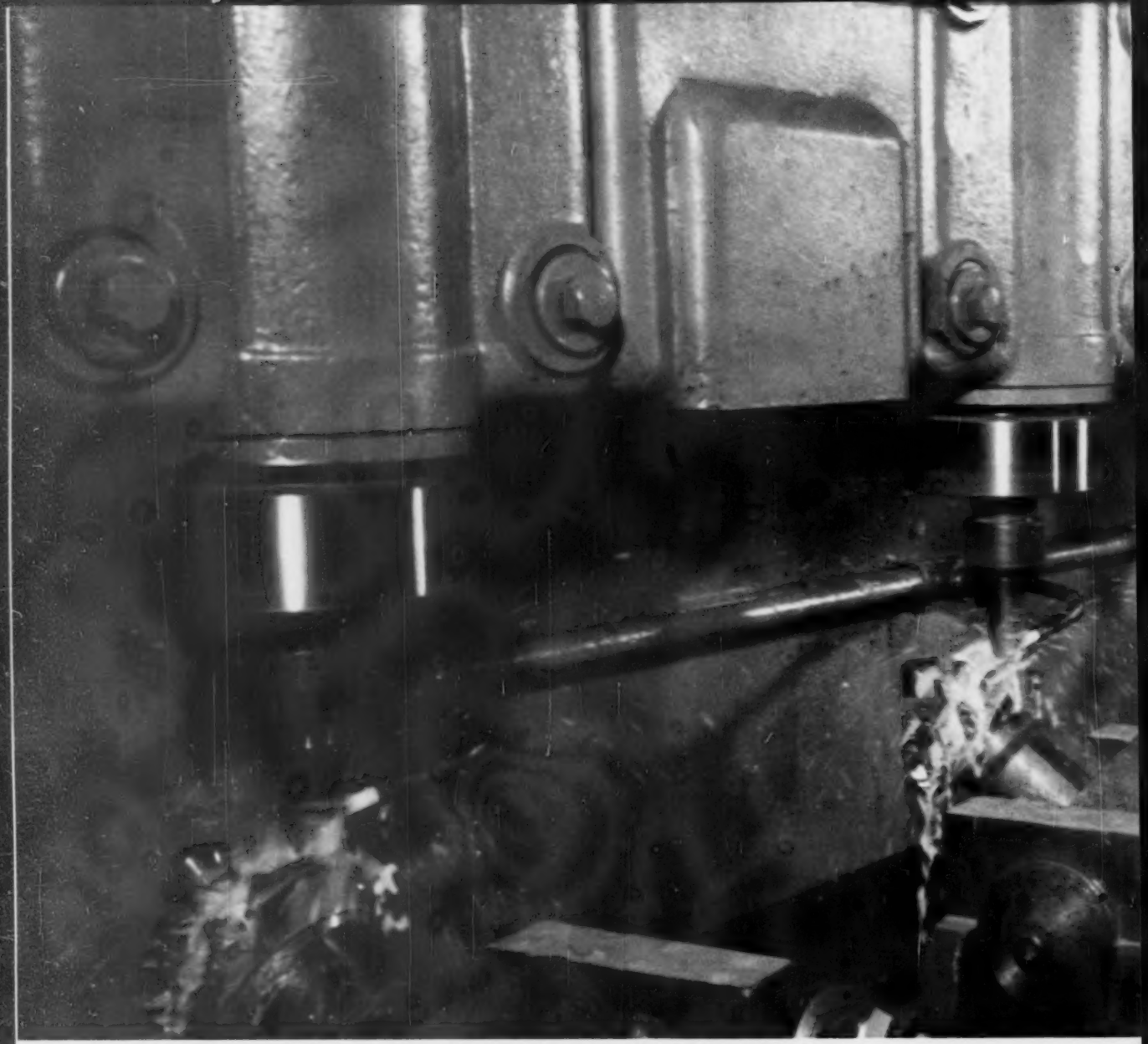
Perforated Metal Screens • Wedge Wire Screens • Cascade Wedge Wire Screens • Wedge Slot Screens • Rubber Clad Perforated Screens • Flanged Lip Screens • Flights • Shaker and Conveyor Troughs

HENDRICK Manufacturing Company
Carbondale, Penna.

Gentlemen:

☐ Please have representative call.
☐ Send me FREE literature on Perforated Metal.

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Title _____
Company _____
Street _____
City _____ State _____



Milling teeth in rock bits on a 4-spindle machine. The coolant: Gulfcut Heavy Duty Soluble Oil.

Change to Gulfcut® Heavy Duty Soluble peeling, cuts maintenance costs . . .

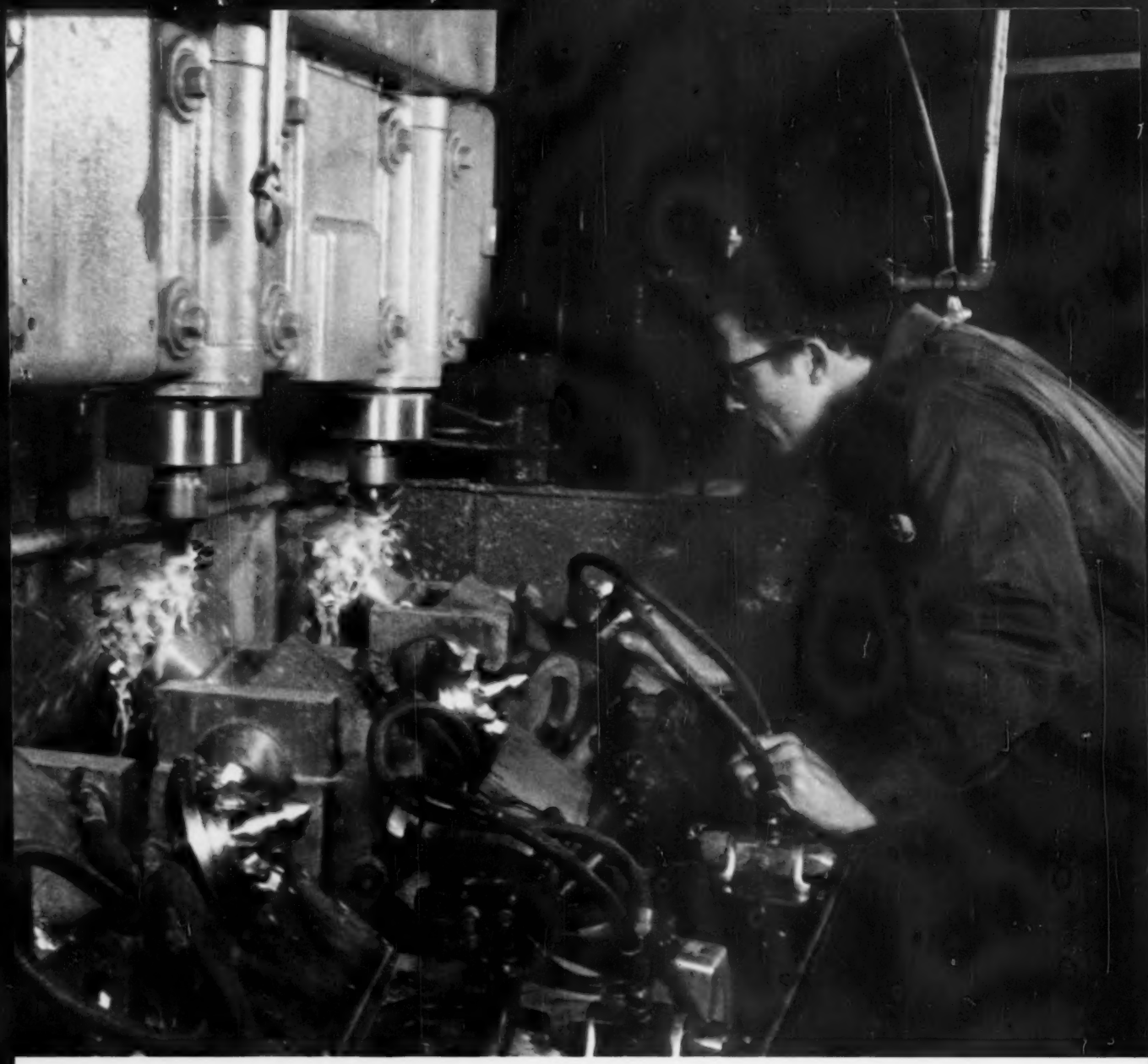
Varel Manufacturing Company has supplied rotary drilling tools to the oil industry for many years. Recently, this Dallas, Texas, firm had to battle a severe rust problem—in gearboxes and on finished parts.

The company turned to Gulf for help. And got it. Gulf Engineers recommended Gulfcut Heavy Duty Soluble Oil in place of the chemical coolant then in use. Result: no more rust!

"By eliminating rust, scale and other junk," says Malcolm Thomas, Production Manager, "we brought maintenance costs down to earth. Before the switch, our gearboxes got so rust-infested that we had to down machines for a whole day to clean them out. But that's no longer a problem—and neither is paint peeling.

"Here at Varel, we use a mixture of 30-40 parts water and one part oil. And we've found that Gulfcut Heavy Duty Soluble Oil meets every one of our machining requirements."

If you're faced with a stubborn machining problem, give us the opportunity to show you how Gulf makes



Oil eliminates rust and paint
GULF MAKES THINGS RUN BETTER!

things run better! Call a Gulf Sales Engineer at your nearest Gulf Office. Or write for Gulfcut literature.

GULF OIL CORPORATION
Dept. DM, Gulf Building
Houston 2, Texas

GULF



R. J. Blanton, left, Executive Vice-President & General Plant Manager of Varel Manufacturing Company, and Grover Garrison, Gulf Sales Engineer. In the foreground, a 12¼" VHI rock bit.

SP-10049

Famous BUTLER building panels formed from BONDERIZED, color-coated hot-dip galvanized coil



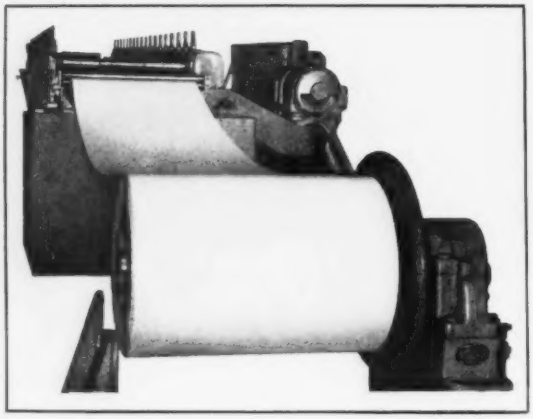
Butler Manufacturing Company building panels, Bonderite-treated and with baked-on finish, are easily and quickly erected.

BUTLER PANELS LOOK BETTER LONGER! Those attractive Butler buildings, with their strong ribbed panels and handsome colors, will retain their appearance through many years of weather and hard service.

Butler panels are formed from Bonderized, pre-finished hot dip galvanized stock. This combines the corrosion-resistance of hot dip galvanized with the advantages of baked-on finish, over Bonderite, to produce panels with vastly increased durability.

Bonderite is the key to the superior adhesion which allows forming *after* paint coating, without damage to the finish on Butler panels. Bonderite produces a close, small-grained, nonmetallic crystalline coating integral with the metal itself—a perfect base for any finish.

For the finest, most durable protective finish on your product, make the choice that quality manufacturers like Butler have made. Insist on Bonderite under the finish!



A coil of Bonderized, pre-finished galvanized steel feeds into roll former at a Butler plant.

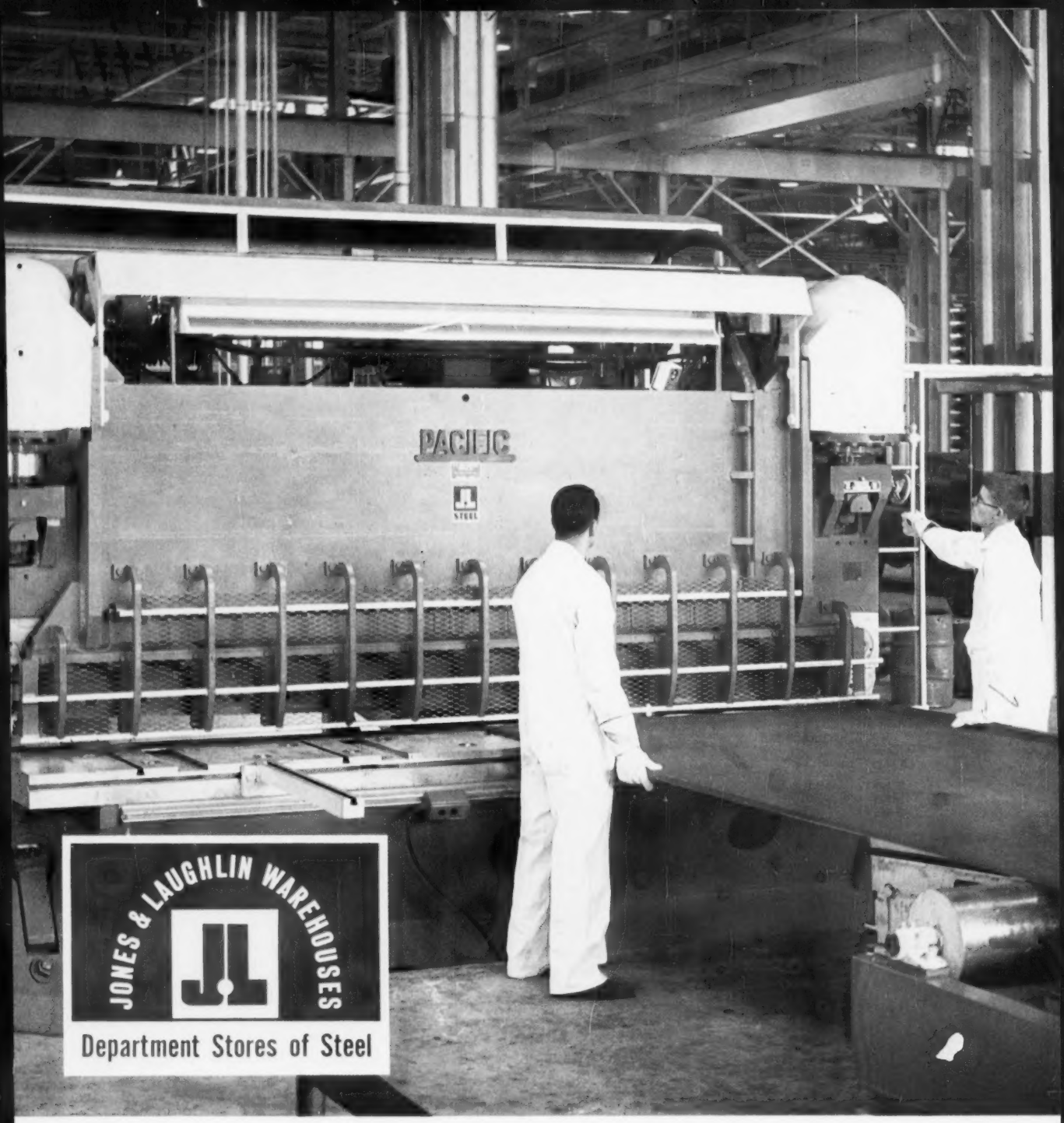
PROTECTED BY Bonderite PARKER RUST PROOF CO. QUALITY CORROSION RESISTANT

Parker Rust Proof Company
2197 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE corrosion resistant paint base • BONDERITE and BONDERLUBE aids in cold forming of metals • PARCO COMPOUND rust resistant • PARCO LUBRITE—wear resistant for friction surfaces • TROPICAL—heavy duty maintenance paints since 1883

Since 1914—Leader in the field

*Bonderite, Bonderized, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

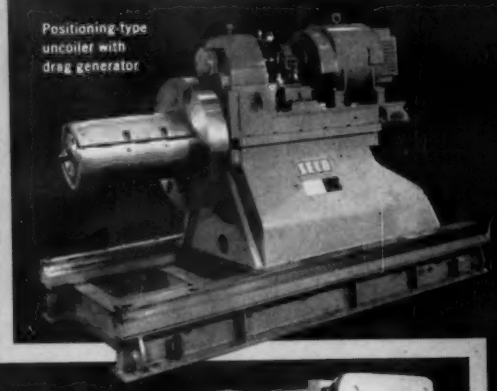


J & L Steel Service Centers—efficient and dependable. You name it and you can get it—at the Department Stores of Steel. This massive 12 foot hydraulic shear, for example, cuts plate squarely and accurately up to ¾" thick . . . to meet your exact specifications. Modern machinery like this, skilled warehousemen trained to give *extra* care to every order, plus ready-to-go stocks of carbon, stainless and specialty steels—all add up to faster, more efficient service for today's J & L customers.

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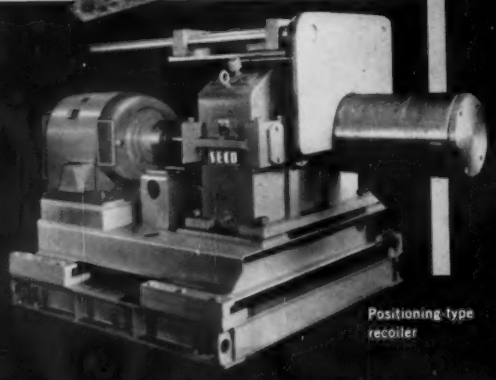
Positioning-type uncoiler with drag generator

Predictable Performance

for processing lines with

SECO

terminal equipment



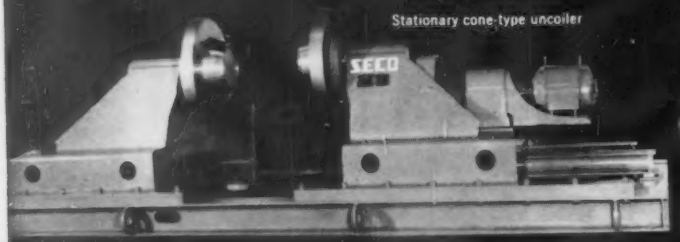
Positioning-type recoiler

From entry to exit, new and modernized processing lines . . . annealing, pickling and others . . . perform better with SECO terminal equipment. This equipment handles coils ranging from 10,000 to 50,000 pounds with speed, convenience, safety.

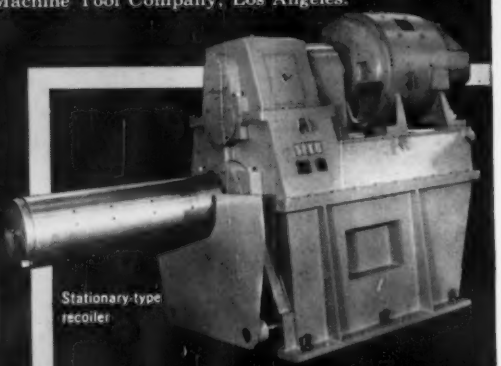
SECO uncoilers and recoilers are designed to operate at any speed the mill requires, are available in positioning or stationary types. The positioning types feature a slideable reel base mounted on a sub-base for alignment with the processing line, actuated by an automatic edge control.

SECO also makes auxiliary equipment such as coil cars with coil lifts to simplify uncoiler loading and recoiler unloading. Available for mandrel or cone-type reels.

A staff of trained sales engineers will assist you in finding the equipment best suited to your needs. Call or write today. West Coast representative: United Machine Tool Company, Los Angeles.



Stationary cone-type uncoiler



Stationary-type recoiler

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
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P. O. BOX 737, WARRENSVILLE STATION • CLEVELAND 22, OHIO

Affiliated with Lee Wilson Engineering Co., Inc.



Problem: Paint jobs ruined by airborne dirt in spray booth

This plant needs make-up air! If the exhaust fans in your paint shop remove air faster than you replace it, they cause a vacuum. The vacuum sucks in dirt and dust every time a door or window is opened. Your plant needs make-up air...a supply of new air to replace exhausted air and cancel out vacuum.

Without make-up air, you get a chain reaction of vacuum problems. Violent cross drafts...Infiltration of dirty air or fumes from outside, and from one plant section to another ...Heat loss...Unhealthy workers... Low morale...Costly absenteeism.

Solution: install separate fans to supply make-up air. They cancel out the vacuum, give your plant balanced ventilation. These fans should be part of a complete make-up air system that tempers and cleans the incoming air.

For technical help on make-up air, see your Consulting Engineer. Or call in Sturtevant application engineers. They're experts in handling air...whether you want to move it, heat, cool or clean it. Mail coupon for booklet on make-up air.

J-80709

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How? Simply by owning a Dravo-Linde AG tonnage oxygen facility at your plant or mill site. The financial and operational reasons for owning your steam, water and compressed air facilities are equally valid and applicable to the new utility—oxygen. In fact, a steel-producing or chemical process plant can realize savings on oxygen costs of $500,000 to $1,500,000 annually from user-owned and operated Dravo-Linde AG plants. Proportional annual savings can be expected should you elect to lease such facilities. As remarkable as they may seem, these savings of up to 40% are based on estimated costs of $15.00 per ton on a demand of 200 tons/day to $9.60 for 1000 tons/day of purchased gaseous oxygen from on-site plants. The heart of the process—the Linde AG air separation unit—incorporates the latest developments in economical low-



pressure operation and possesses an unequaled safety and reliability record. All air is compressed or expanded through centrifugal equipment. Maintenance is minimized. Defrosting is not required more frequently than once a year. Simplicity of plant operation permits quick and easy training of your present personnel. But the savings do not stop here. Integration of a Dravo-Linde AG oxygen plant with your existing facilities, made possible by Dravo's extensive experience in engineering and constructing major installations and utility services for industry, can reduce both investment and operating costs even further. Prove these facts as they relate to your own operation. Contact P. J. Berg, Dravo Corporation, Pittsburgh 22, Pennsylvania. EXpress 1-2600.

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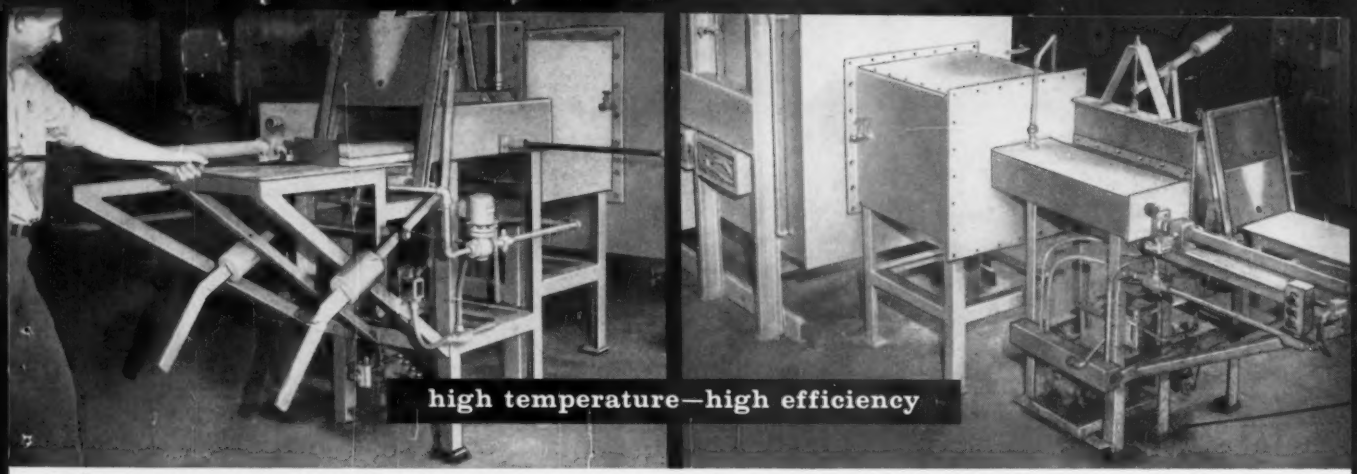
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This new Lindberg Molybdenum Element Pusher Type Atmosphere Furnace has a maximum temperature of 3000°F. with 60KW input. It embodies high temperature refractories suitable for low dew point without muffle and is ideal for sintering stainless steel compacts in hydrogen or dissociated ammonia. Furnace provides side loading and discharge ports with purging chambers. Installation at right also shows conveniently located ammonia dissociator and control panels.

If your production processes require sintering you can depend on getting exactly the right equipment for your needs from Lindberg's comprehensive line of dependable, efficient, production-proven furnaces



This Lindberg Mesh Belt Continuous Type Furnace has a temperature range of 1300°F. to 2100°F. and production capacity up to 500 lbs. per hour. It is a very popular type furnace for sintering small metal powder parts. Similar furnaces are also being used for brazing and bright annealing.



Lindberg Roller Hearth Continuous Type Furnace handles loads up to 2200 lbs. per hour in temperature range 1300°F. to 2100°F., for bright annealing, silver brazing and sintering metal powder.



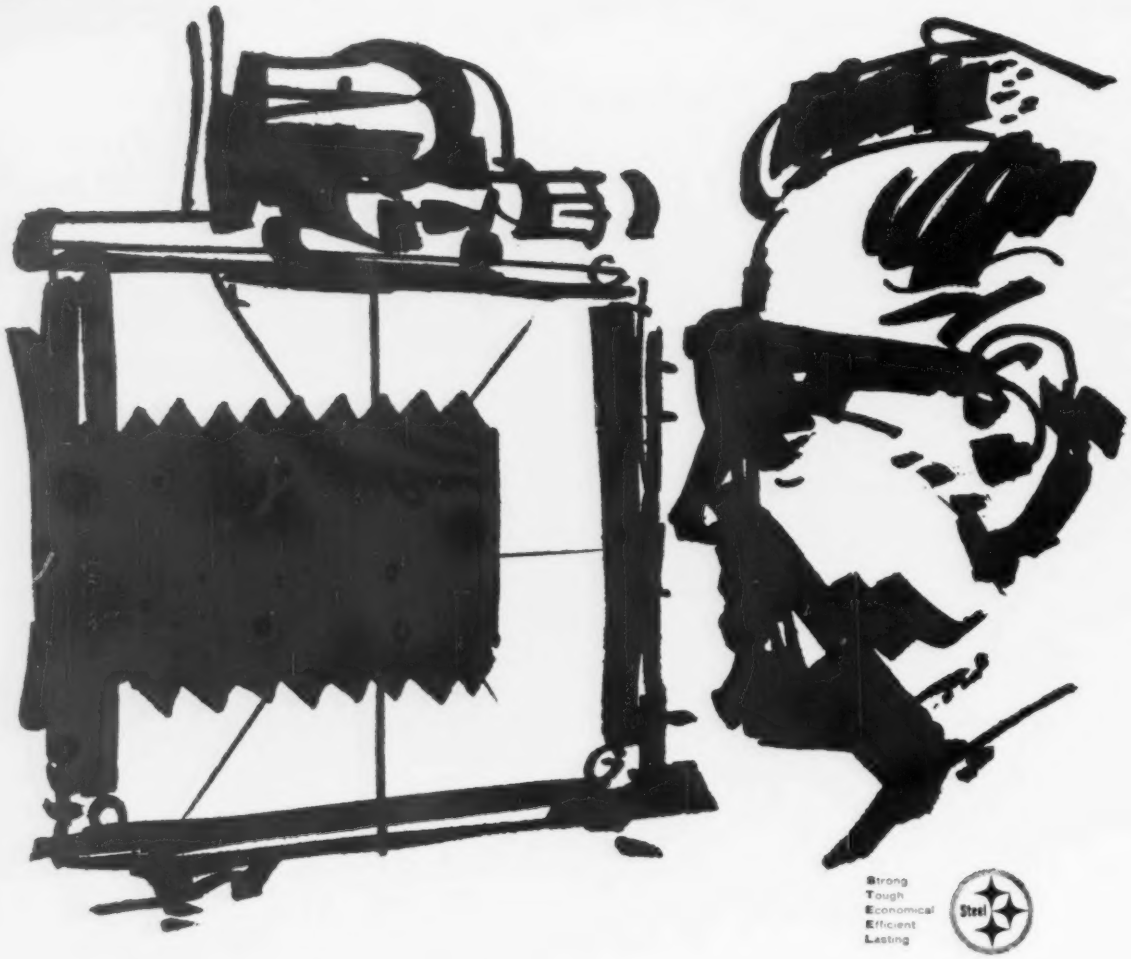
Lindberg Hand Pusher Batch Type Furnace has a temperature range of 1300°F. to 2500°F. Also sintering capacities from 25 to 300 lbs. per hour available.

For full information on the furnaces illustrated and Lindberg's complete line of sintering and brazing furnaces, just get in touch with your local Lindberg Field Representative (see classified phone book) or write direct. Please remember, too, that Lindberg offers a variety of Atmosphere Generators to provide, efficiently and economically, the proper atmospheres recommended for use with our sintering furnaces. Heat Treating Furnace Division, Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois.

Los Angeles plant: 11937 S. Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg Ltd., Toronto.

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ARMCO Sheffield Division

ASARCO ALLOY ADDITIVES



Improved alloys at less cost with "ready to add" master alloys

Asarco alloying materials, produced under strict metallurgical controls, reduce alloying costs, improve casting performance, and contribute substantial savings in subsequent production costs.

BISMUTH is used to improve the dispersion of graphite in malleable iron castings. Available in shot, pellet and ingot forms.

SELENIUM improves machinability of stainless steel, controls its porosity. Asarco master alloys include ferro-selenium and nickel-selenium containing 50-60% selenium, and selenium powder.

TELLURIUM is used for degasifying, to minimize porosity, and improve machinability of stainless steel. It is also used for producing hard chilled iron castings. Ferro-tellurium containing 50-58% tellurium is available in chunk form. Tellurium is also available in powder, stick, slab and tablet forms.

Federated Metals Division produces and sells:

PELLET LEAD, readily assimilated into molten steel, dissolves into finely dispersed particles which lubricate and result in faster, smoother machining, longer tool life.

PHOSPHOR COPPER used as a deoxidizer, in shot or waffle form, improves castability, assures sharper detail, reduces porosity.

OTHER ALLOY ADDITIVES produced by Federated are: Aluminum, Arsenical Copper, Chromium Copper, Copper-Nickel Shot, Manganese Copper, Silicon Copper, Titanium Aluminum, Copper Magnesium, Copper Shot, Cadmium Copper, Copper Iron, Aluminum Copper.

For complete information, write on your company letterhead to: Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, New York.

ASARCO



Just a little

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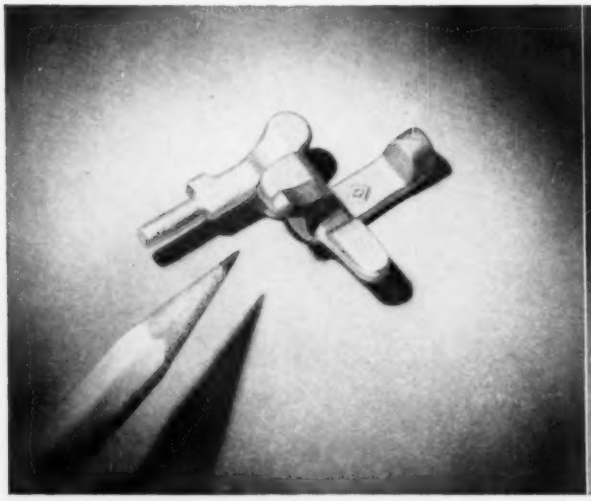
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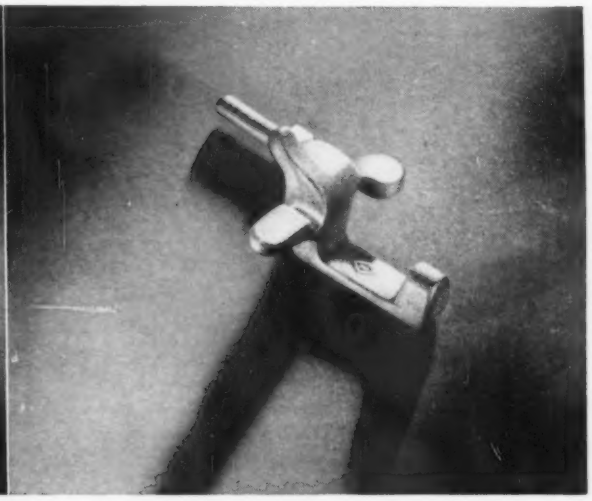
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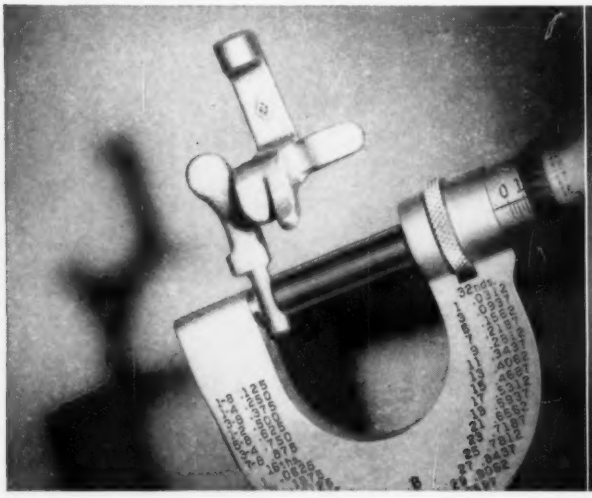
THIS INTRICATE FORGED PART WILL GIVE YOU NEW IDEAS . . .



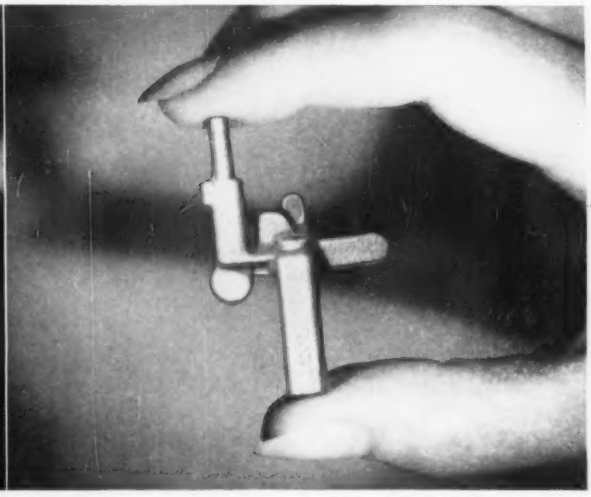
ON STRENGTH Insurance against equipment failure was the primary specification for this steel part for an electronic key punch machine. A Williams forging was selected to give the required strength and toughness for greatest dependability during high speed operations.



ON SHAPE The complicated contours of this part require controlled grain flow in many directions to provide maximum strength at points of greatest stress. Here the desired result was achieved by a parting line that is a complex intersection of 5 planes and 2 curved surfaces.



ON SIZE No part is too small for Williams. This part weighs only ½ ounce, yet Williams forging designers give the same attention to quality and cost of manufacture within close tolerances as they do to large forgings weighing up to 250 lbs.



ON FORGEABILITY Besides greater freedom of design, Williams forgings often result in fewer finishing operations, lower unit cost at point of assembly and dependability for years of heavy duty, in-service use. Let us help you determine the *forgeability* of your next part.

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CF&I Shaped Coils and Stem-Paks® are Packaged for Your Production

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Here's a quote from one satisfied user, the president of a wire fabricating plant:

> "A CF&I salesman examined our operation and suggested that we use CF&I Shaped Coils as opposed to the small coils we had previously used. We now stop our machine only once to start a new coil, instead of 10 times a day. We save nearly 2 hours, and have increased our production by about 20%."

CF&I-Wickwire Shaped Coils contain between 1500 and 2500 lbs. of top quality wire in one continuous length . . . are bundled with four steel straps and, when necessary, wooden supports to insure that the coil is not distorted.

OPERATING ADVANTAGES: Increased production, reduced material-handling costs, less wire scrap and less storage space needed.

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> "Up to 75% of our production downtime was caused by using too many small coils. Stem-Paks hold 500 to 1000 pounds of continuous wire. These larger packages keep each machine running as much as 1½ hours longer per day. Stem-Paks allow for free unwinding, without snarling. CF&I Stem-Paks have increased our production 50%."

Stem-Paks hold 500-1000 lbs. of wire in one continuous



length . . . consist of a center core attached to a wooden base mounted on 4″ runners.

AVAILABLE IN: Sizes for 14″, 17″ and 21″ center core (inside diameter).

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Only CF&I offers a total of ten different wire packages. You've just read how two of these packages have increased the production efficiency of leading manufacturers. One or more CF&I-Wickwire Wire packages can do the same for you. Our engineering staff will be happy to study your operation and recommend the type that best meets your requirements. For complete details, write your local CF&I sales office.



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Is yours plain or fancy? . . . . part or product?



It's hard to put a label on metal forms like these. That bellows-shaped assembly in the center, for instance, gets cut up into units that become flour sifters.

The point is—your design or specs are the result of careful planning. How they are produced—and who is best qualified to do it—should have the same careful consideration.

As these custom-produced parts show, A.S.C. Divisions have the ability—and agility—to meet complex or simple requirements. Try them.



For detailed information about who we are and what we make, write for "Pocket Guide to Springs and Other Things."

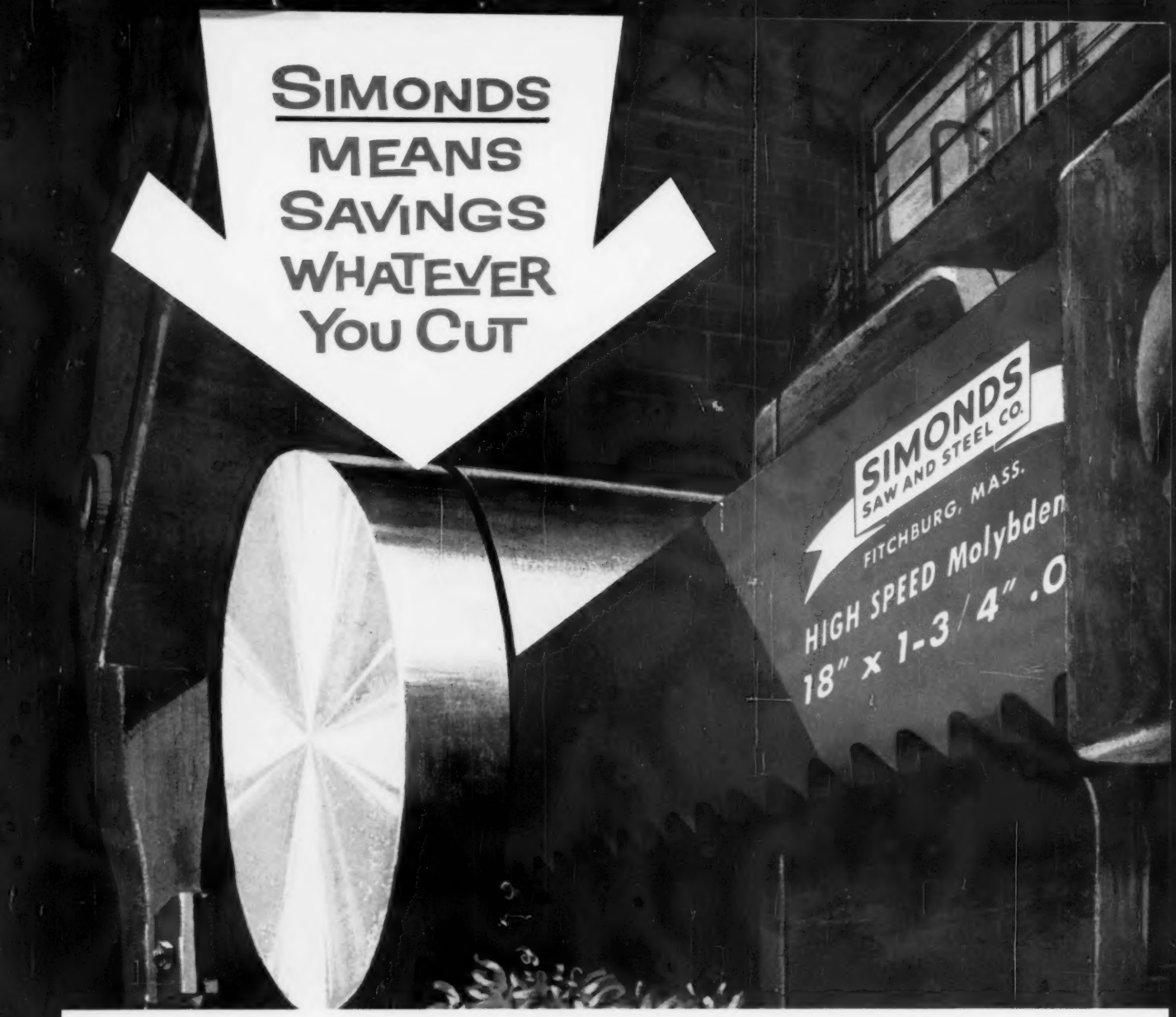
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Associated Spring Corporation

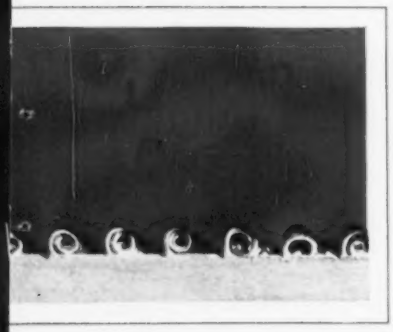
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Steel

for Strength
. . . Economy
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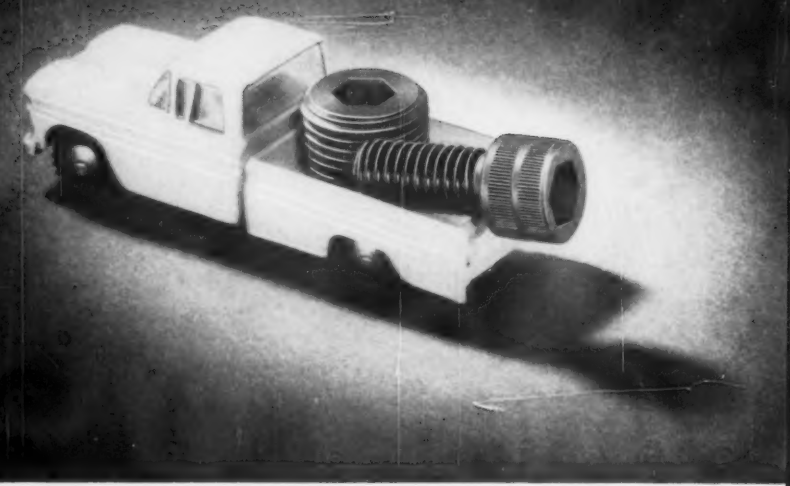
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THE HOLO-KROME SCREW CORPORATION • HARTFORD 10, CONN.

Apex worked closely with Republic, and Thornel and Associates in determining the best box design for their job. The Republic Drop Bottom Boxes are 54″ wide, 62″ long, and 45″ deep. Made of highest quality steel, with reinforced corrugated design for rugged, long-life service.



NEWEST IDEA for storing drums—strong, low-cost Republic Portable Drum Racks. Of all-steel channel construction, the racks assemble quickly and save valuable floor space. Available for immediate delivery. Mail the attached coupon for more information.



MEASURE, CUT, ASSEMBLE. That quick, with Republic METAL LUMBER® you have stronger, safer framing for any application where common building materials are now being used. Comes in two gages, two widths, standard bundles of 10- or 12-foot lengths. Send coupon.



CONTRACT MANUFACTURING SPECIALISTS. From design through engineering and fabrication, rely on Republic for contract production of sheet metal products. Wide range of facilities means that Republic can handle your complete job (or any phase of it) . . . often at considerable savings. Send for information.

Apex mechanizes material handling with Republic Drop Bottom Boxes...

OPERATING ECONOMIES TO PAY FOR NEW EQUIPMENT WITHIN 2½ YEARS

From scrap receiving to melting furnaces, Apex Smelting Company, Chicago, has mechanized and streamlined operations with 900 new Republic Drop Bottom Steel Boxes. Here is modern containerization in action—eliminating manual handling; stopping scrap material loss; facilitating an accurate records system; and *saving dollars every step of the way.*

According to Mr. P. R. Janney, Apex project engineer, operating economies resulting from the use of Republic Drop Bottom Boxes will pay for the new equipment over a short, easily amortized period of from 2 to 2½ years.

Apex buys scrap metals, which are sorted, prepared, stored, and finally melted down and poured into pigs of specification aluminum alloy for resale. Formerly scrap was transported to the sorting equipment in a variety of temporary containers — drums, wood cartons, burlap bags. After sorting, it was stored in bins, then hand and power shoveled into containers to go to the melters.

Now scrap is mechanically loaded into Republic Drop Bottom Boxes at the receiving dock, carried to the sorter by fork trucks, sorted, prepared, and reloaded into the same boxes. Card pockets on each box speed identification of its contents for charging into melters.

WHATEVER YOUR MATERIAL HANDLING OR CONTAINERIZATION PROBLEM, Republic's Material Handling Engineers can help you solve it. Republic equipment is engineered and built to your specific job requirements. Send the coupon for more information.

REPUBLIC STEEL

Republic Has The Feel For Modern Steel

Strong, Modern, Dependable

REPUBLIC STEEL CORPORATION
DEPT. IA -1962
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on the following:

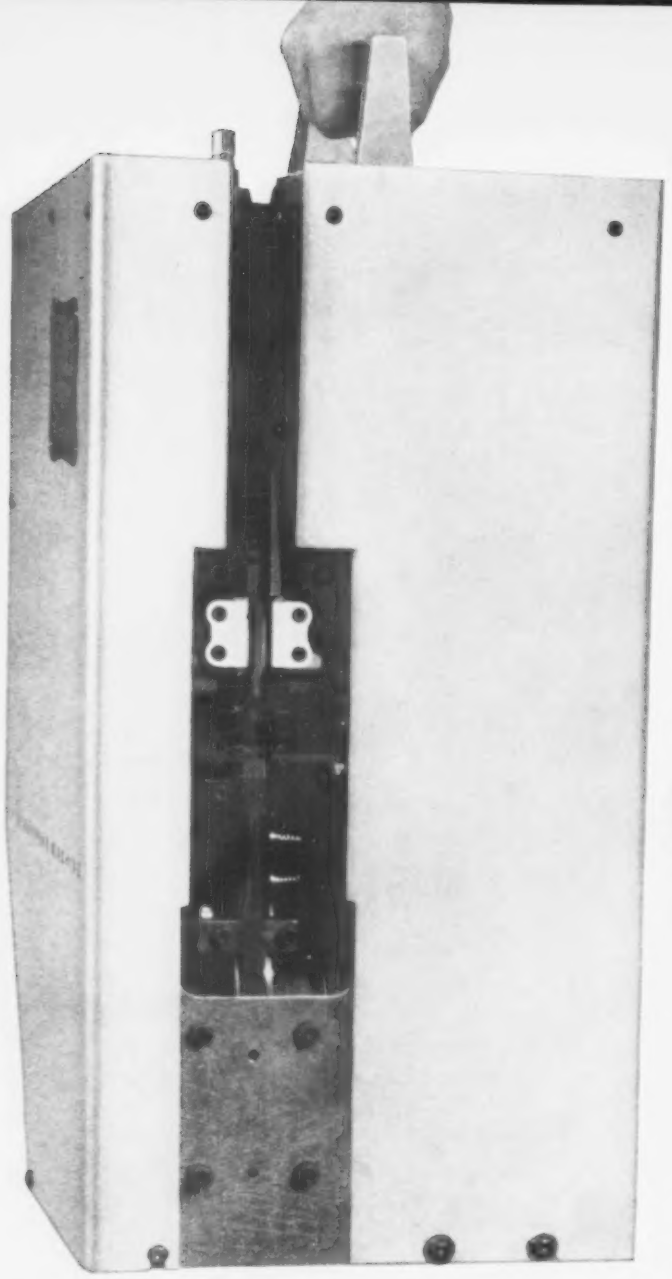
☐ Republic Material Handling Units ☐ Contract Facilities
☐ METAL LUMBER® ☐ Drum Racks

Name_____ Title_____

Firm_____

Address_____

City_____ Zone_____ State_____





Now, Acme Steel brings you *(literally!)*
the world's first strapping machine with

FULL-SIZE PERFORMANCE...



PINT-SIZE PRICE

THE REVOLUTIONARY **F7**

. . . so *compact*, we can carry it right into your plant . . . so *complete*, it does everything you want a powered strapping machine for: fast feeding, tensioning, sealing and cutting. And so *conservative in cost!*

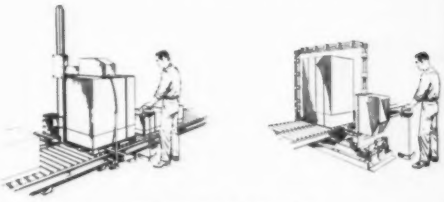
The new F7 is not a stripped down facsimile of a larger machine. Its surprisingly low initial cost and operating economy are engineered into the strapping mechanism—a 75 pound, self-contained unit that doesn't rely on complex (and costly to service) electronic circuits. You can adapt it for any regular duty strapping job, equip it for the exact degree of automation you desire (at right are a half dozen actual applications).

Now, even modest volume operations can discard outmoded methods. Big users can set up additional strapping lines at a fraction of their former cost. And everyone can give production bottlenecks the slip—the low-cost F7 strapping mechanism can be replaced with a standby in a few minutes!

Call your Acme Idea Man for a quick *carry-in* demonstration. See how the new F7 can handle your packaging operation at a greater profit. Or, return the coupon for full facts.



A HALF DOZEN WAYS



THE F7 CAN LOWER



PACKAGING COSTS

ACME STEEL IDEA LEADER IN **STRAPPING**

ACME STEEL COMPANY
Dept. IFS-41, 135th St. & Perry Ave.
Chicago 27, Illinois

☐ I would like an F7 demonstration in my plant.
☐ Send complete information on the new F7.

NAME_____

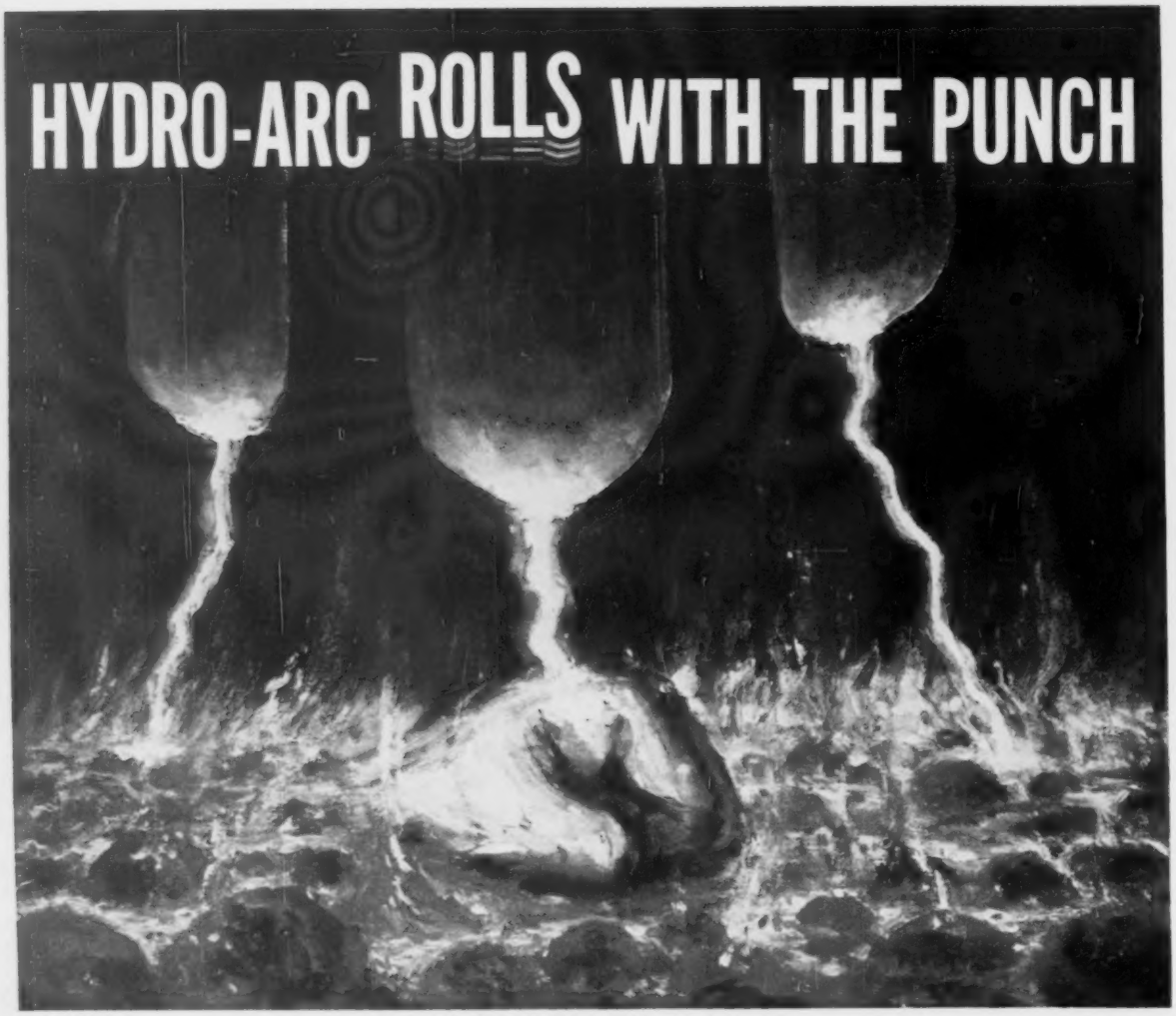
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HYDRO-ARC ROLLS WITH THE PUNCH



FASTER THAN ANY OTHER FURNACE!

Electrodes must literally "roll with the punch" to maintain the precise arc gap for peak heat intensity in relation to surface of melt. This means *instantaneous* adjustment to constant surface roiling caused by shifting charge or escaping vapors.

HYDRO-ARC alone offers electrode controls developed specifically and exclusively for electric furnace operation. Not one but two *non-reversing* electrode motors are used to operate this hydraulic control. An exclusive air counterbalance further speeds reaction. The movement of HYDRO-ARC electrodes is *instantly* and *automatically* monitored by the very energy of the arc itself! You get faster, cleaner melts, lower costs, and virtually no electrode breakage.

Learn how Hydro-Arc can lower *your* melting and processing costs while increasing production and quality. See your Whiting Furnace Engineer, or write for Hydro-Arc Catalog FY-168. *Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois. In Canada: Whiting Corporation (Canada) Ltd., 350 Alexander Street, Welland, Ontario, Canada.*



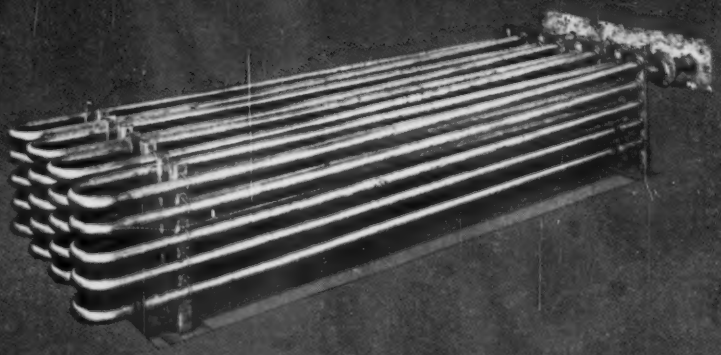
90 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

ELECTRIC-ARC FURNACE

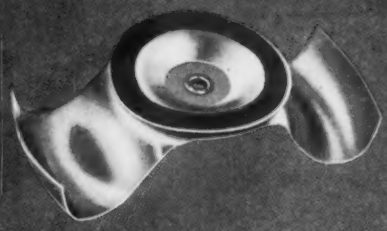
WHITING

MANUFACTURERS OF CRANES; TRAMBEAM® HANDLING SYSTEMS; PRESSUREGRIP, TRACKMOBILES,® FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT

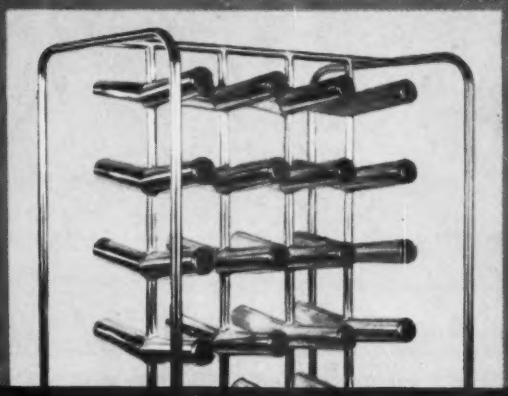
you can bend it...



you can form it...



you can weld it...



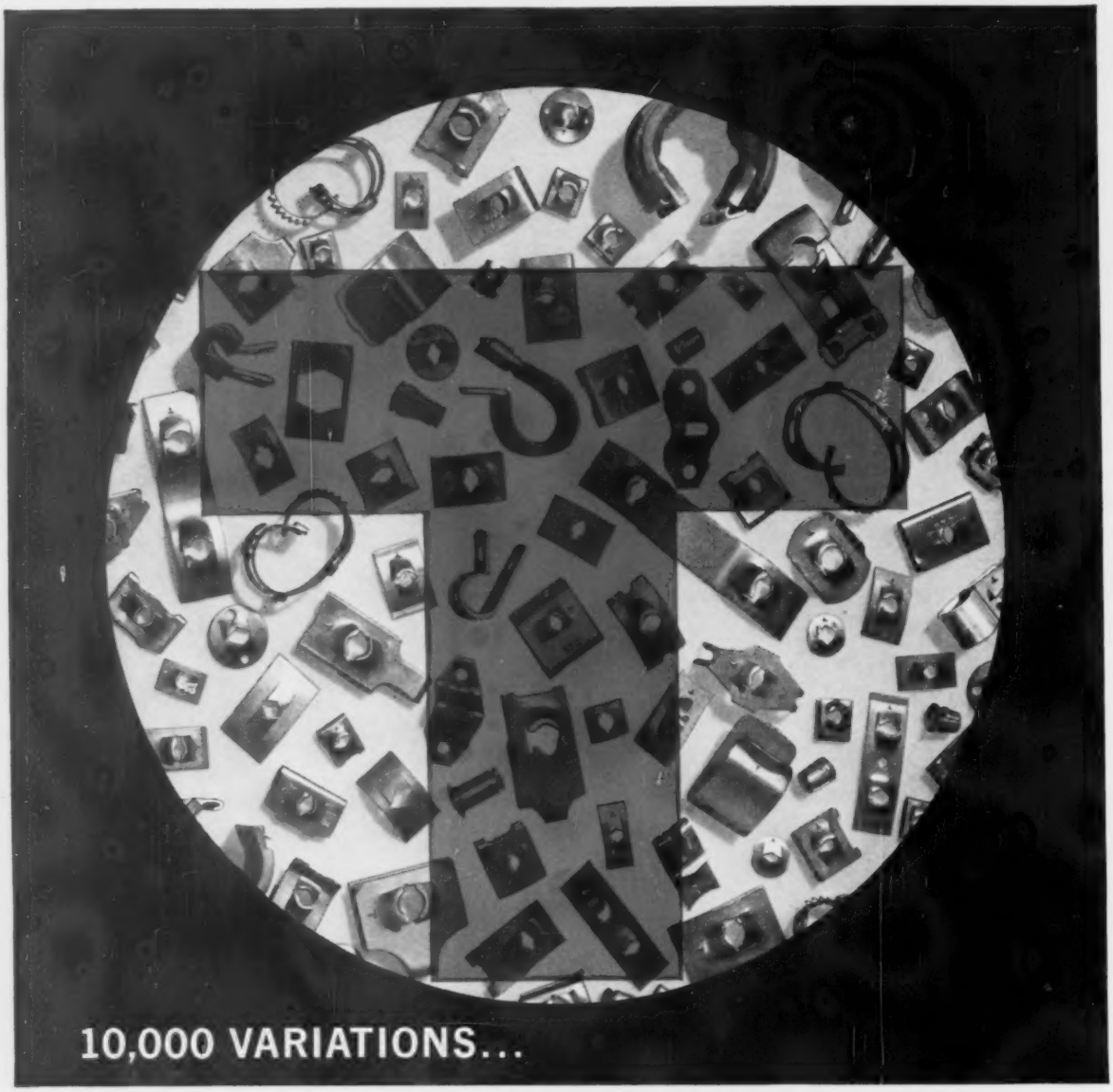
but you can never, no never, change its **consistent uniformity!**

...no matter what test you put it to, you'll get consistent performance, greater output, better quality and more profit with **Carpenter Specialty Stainless**...produced by one of the leaders of stainless steels for industry.

Carpenter steel

you can do it ***consistently*** better with Carpenter Stainless Steels for specialists

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

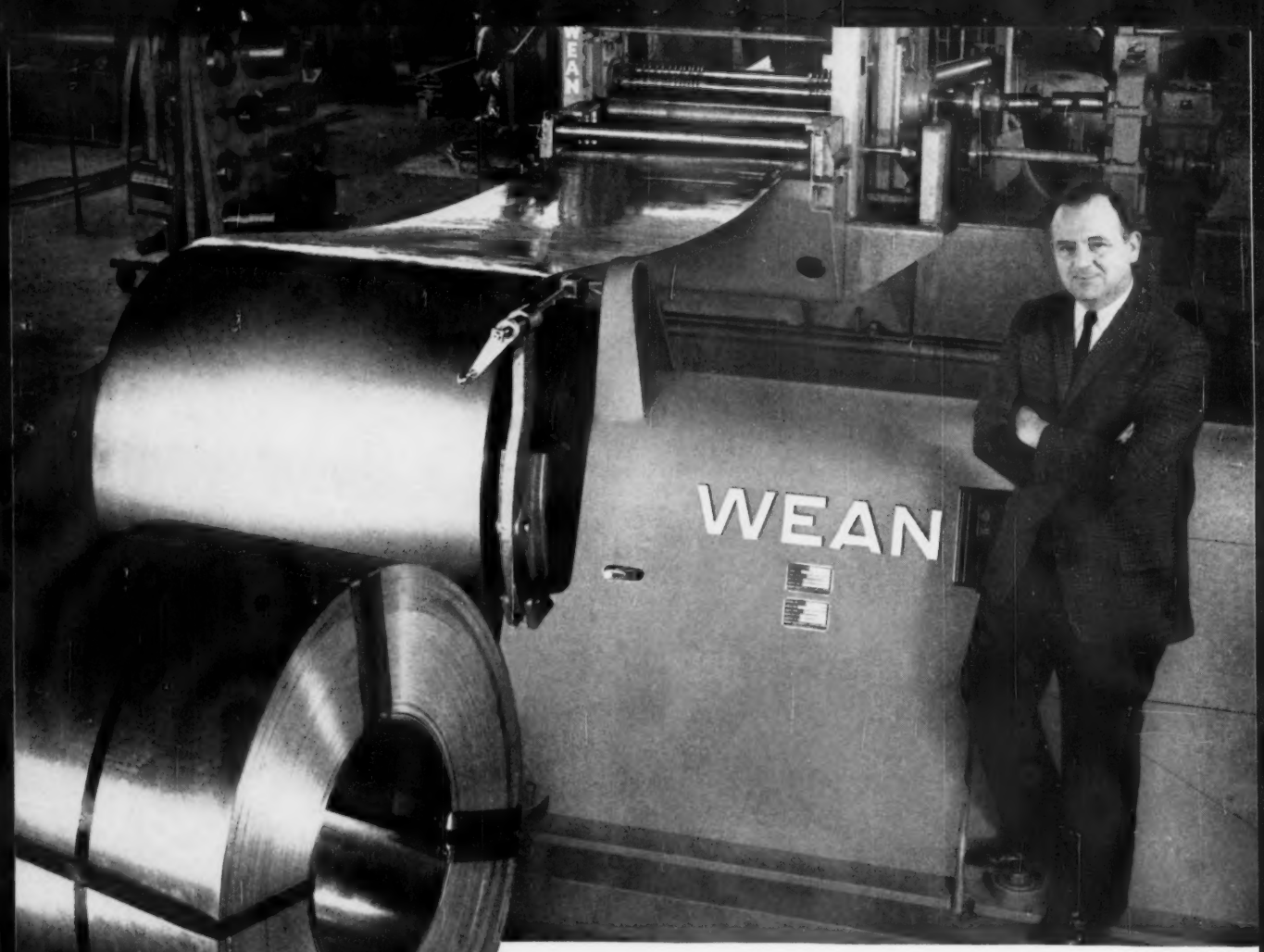


all stamped with the T-MARK of total reliability

Other spring fasteners may *look* like Tinnerman SPEED NUTS. But only those stamped with the T-mark really *are* SPEED NUTS, made to Tinnerman's high, precise standards of reliability. Tinnerman quality controls are the most stringent in the industry. And only Tinnerman stocks a *half-billion* SPEED NUTS . . . is tooled to turn out 10,000 variations . . . develops 25 *new* designs each week. Protect your product's good name by insisting on genuine SPEED NUTS. Stamped with the Tinnerman "T"—the mark of total reliability. *Tinnerman Products, Inc., Department 12, Box 6688, Cleveland 1, Ohio.*

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario.
GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales.
FRANCE: Simmonds S.A., 3 rue Salomon de Rothschild, Suresnes (Seine).
GERMANY: Mecano Simmonds GMBH, Heidelberg.

TINNERMAN
Speed Nuts®
Look for the Tinnerman "T"



JOSEPH RAFFERTY, JR., President of Rafferty-Brown Steel Co., Inc., says:

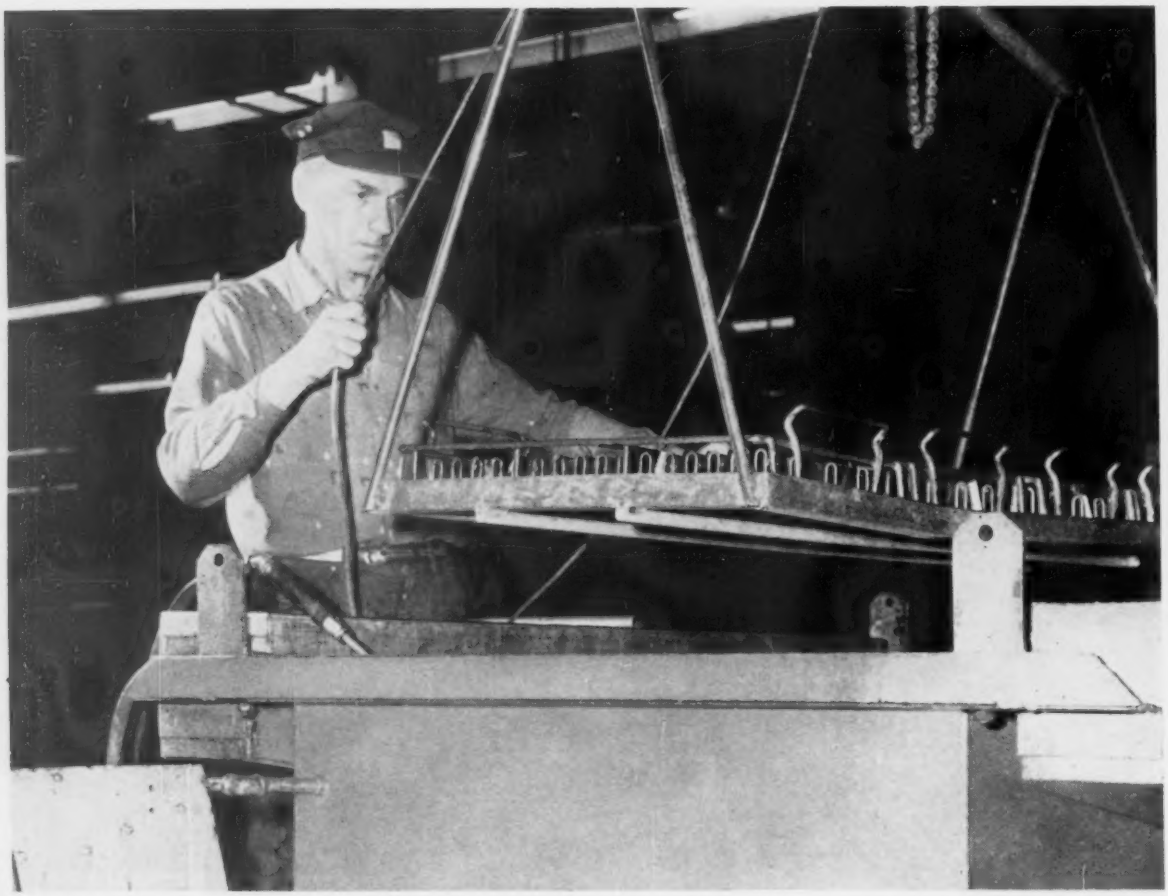
"We've produced as much as 1300 tons per month for nine years without major maintenance on our Wean Slitting Line. Much of the time, this 48-inch Wean line has operated on a three-shift basis, helping us to economically meet our customers' needs for hot rolled, cold rolled and silicon steel coils. We've also used the Wean line for slitting aluminum coils. With this kind of dependable performance, we're exceptionally proud of the line."

Mr. Rafferty's experience has been duplicated many times by other steel warehousing firms that have used rugged Wean Equipment in applying the *coil processing concept* to cut inventory, production and material costs. If you process 500 or more tons per month of flat-rolled metals, write for our new brochure, "Coil Processing," which explains the concept and economics of continuous coil processing.

WEAN EQUIPMENT CORPORATION
22800 Lakeland Boulevard, Cleveland 17, Ohio Cable: WEANCOR

WEAN

Represented by these Associate Companies:
The McKAY MACHINE COMPANY (metalworking) • The WEAN ENGINEERING COMPANY, Inc. (primary steel)



WHERE HOOKER TRICHLORETHYLENE RAISED QUALITY AND LOWERED COSTS

Approximately a year ago, the Metals Processing Division, Curtiss-Wright Corporation, began using high-quality Hooker NIALK® TRICHLORETHYLENE to degrease jet engine blades. Before this, maintaining purity in the baths required frequent cleanouts. Chemical costs were high.

Immediate results with Nialk showed a better cleaning job and tighter quality control. Down time for degreaser maintenance has been substantially reduced.

The exceptional cleaning results now obtained permit inspectors to discover possible flaws more easily. Maintaining quality is far less difficult.

The stabilizer in Nialk TRICHLOR contains *psp*—permanent staying power—which enables the stabilizer to operate efficiently until cleanout. After cleanout, the solvent is distilled for further use in other operations.



Curtiss-Wright officials say that the assistance they obtain from Hooker technical experts in preventing waste is most important, since they are working with costly metals. Because the degreasing baths have never turned acid, problems in keeping their quality at a high level and the necessity to run tests have been reduced. Whatever your degreasing job or the type of metal you're processing, Nialk TRICHLOR can give you a greater volume of work and reduce your costs, as well as provide a smooth-running operation.

Contact your nearest Hooker Chemical Distributor for information. Or write us. We will be glad to help you with any problems.

HOOKER CHEMICAL CORPORATION

304 UNION STREET, NIAGARA FALLS, NEW YORK

HOOKER CHEMICALS PLASTICS

Sales offices: Buffalo, Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelphia, Tacoma, Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B.C.



•MACHINES UP TO 50% FASTER
•LENGTHENS TOOL LIFE

Uniloy 303MA is a free machining grade of chromium-nickel stainless steel developed by Universal-Cyclops. It has been proven greatly superior to AISI Type 303 in key plants throughout the country.

Production tests have proved that Uniloy 303MA machines up to 50% faster than Type 303. Cutting tools last longer, decreasing tool cost and machine down time. Completed parts have a better finish than is possible with Type 303, and the corrosion resistance is far superior.

*Patent No. 2,900,250

Send for a copy of our new brochure containing complete data on Uniloy 303MA, and for Performance Reports citing dollar savings achieved by satisfied customers.

Contact your nearest Universal-Cyclops steel service center or sales office. Uniloy 303MA is AVAILABLE FOR IMMEDIATE DELIVERY.

UNIVERSAL CYCLOPS
STEEL CORPORATION
EXECUTIVE OFFICES: BRIDGEVILLE, PA.

STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE METALS

From Kaiser Refractories Research

A NEW FRONTIER IN BASIC BRICK!



REVOLUTIONARY PATENTED PROCESS MAKES POSSIBLE THE FIRST HYDRATION-RESISTANT TAR-BONDED BRICK

Pioneering a new brick-forming process that promises to revolutionize the manufacture of basic brick, Kaiser Refractories Research has developed, patented and proved the industry's first hydration-resistant tar-bonded brick!

This Kaiser patented process develops such increased properties that it is expected to lead the way to improvements in other types of brick to help reduce steel-making costs.

New Kaiser Tar-Bonded brick are even now helping operators achieve new efficiencies. In one oxygen steel vessel, the brick were installed after four months storage in customer's plant—did not hydrate—went on to deliver 27,812 tons of steel in 256 heats. The next lining—Kaiser Tar-Bonded again—went 30,625 tons of steel in 277 heats. And in another shop, another record broken—53 more heats than the best of the eight previous competitive linings.

These new hydration-resistant Kaiser Tar-Bonded brick are now being produced in specially designed plants at Columbiana, Ohio, and Moss Landing, California.

Pioneering cost savings and performance advances in refractories for steel is an every day job at Kaiser Refractories' two research centers.

For detailed information of these latest advances send for your copy of "A Report on Kaiser Tar-Bonded Refractories."



Use the coupon at right or contact Kaiser Refractories & Chemicals Division, Kaiser Aluminum & Chemical Sales, Inc. (Canadian subsidiary: Refractories Engineering & Supplies, Ltd.)

PITTSBURGH 22, PA. . . . . 3 GATEWAY CENTER
MEXICO, MISSOURI . . . . . MEX-R-CO BUILDING
OAKLAND 12, CALIF. . . . . 300 LAKESIDE DRIVE

KAISER REFRACTORIES

HIGH ALUMINA, FIRECLAY AND SILICA REFRACTORIES. PERICLASE BRICK, MORTARS, GRAINS AND RAMMING MIXES

KAISER REFRACTORIES & CHEMICALS DIVISION, KAISER ALUMINUM & CHEMICAL SALES, INC., 300 LAKESIDE DRIVE, OAKLAND 12, CALIFORNIA

PLEASE SEND ME "A REPORT ON KAISER TAR-BONDED REFRACTORIES."

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____



How Nickel Stainless Steel "lightweights" curb Philadelphia subway costs by $6.4 million

Commuters using the Market-Frankford elevated subway line in Philadelphia are smiling these days. So are transit authorities. That's because the line's new subway cars are the most modern in design for passenger comfort . . . and the most economical the city could buy.

Compared to competitive subway cars, during a 35-year depreciation period these new Nickel Stainless Steel cars will:

Operate on $2.4 million less power. They are solidly constructed, yet are so light they run on 12% less electric power than conventional cars based on the same specifications but fabricated from other materials.

Require $4 million less maintenance. Designed and built from Nickel Stainless Steel by The Budd Company to specifications set by the City of Philadelphia and the Philadelphia Transportation Company, these cars need no painting and virtually no exterior maintenance . . . because Nickel Stainless Steel resists corrosion and retains its handsome finish.

And because they are the lightest cars for their size ever built, they:

Help cut running time by 6 minutes. Thanks to the excellent combination of stiffness and high strength found in Nickel Stainless Steel, their thinner-gauge body shells reduce costly dead-weight and make it easier for powerful motors to increase acceleration and braking rates.

Can Nickel alloys save you money? Alone or with other elements, Nickel improves hundreds of alloys, making possible almost any desired combination of properties for meeting specific service demands...while reducing long-term costs. For a guide to information about Nickel, its alloys, and their industrial applications, send for our catalogue of publications. Ask for List "A".

The International Nickel Company, Inc.
67 Wall Street INCO **New York 5, N. Y.**

Inco Nickel

Nickel makes alloys perform better longer

10
Research-Cottrell precipitators for basic oxygen steelmaking

At present Research-Cottrell has designed a total of ten precipitators for basic oxygen steelmaking with a total capacity of approximately 2,000,000 cubic feet per minute.

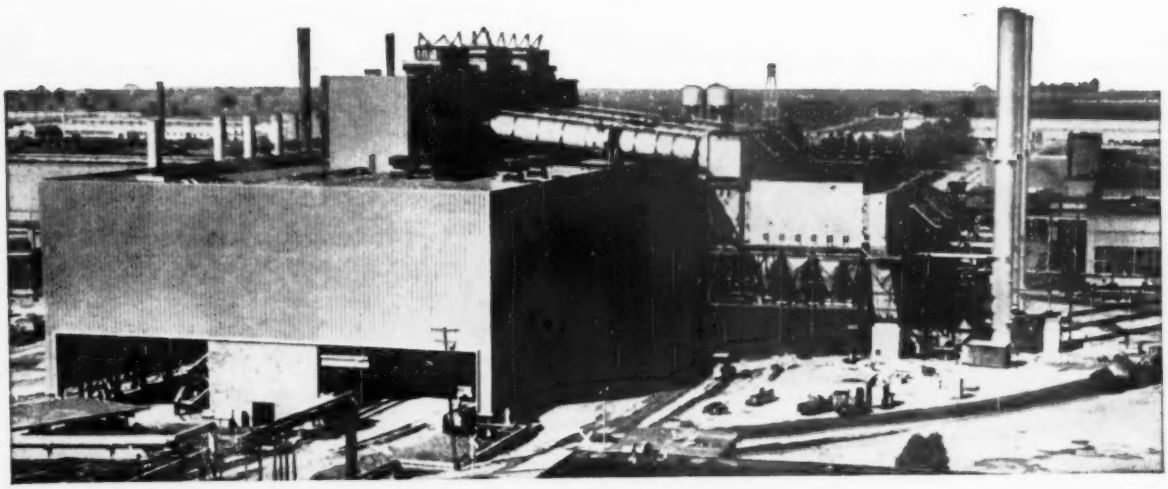
The World's Largest Electrical Precipitators For Basic Oxygen Steelmaking

The Cottrell precipitators at the right of the photo remove dust and fume from waste gases at the Kaiser Fontana Plant with 99.8% efficiency. This huge new basic oxygen steel plant was designed and constructed by Kaiser Engineers.

The three Cottrells were designed and built by Research-Cottrell to clean 607,500 cubic feet of gas per minute from the oxygen furnaces. They are installed between the furnace exhaust ducts and the fans serving the three stacks seen at right below.

The high gas cleaning efficiency of this installation is obtained by means of tested and proven Cottrell design features including electrical sectionalization, Opzel collecting plates, and continuous, automatic operation of high tension rappers and M.I. plate rappers.

Research-Cottrell provides the most modern and comprehensive engineering and equipment available, based on hundreds of Cottrell installations all over the world.

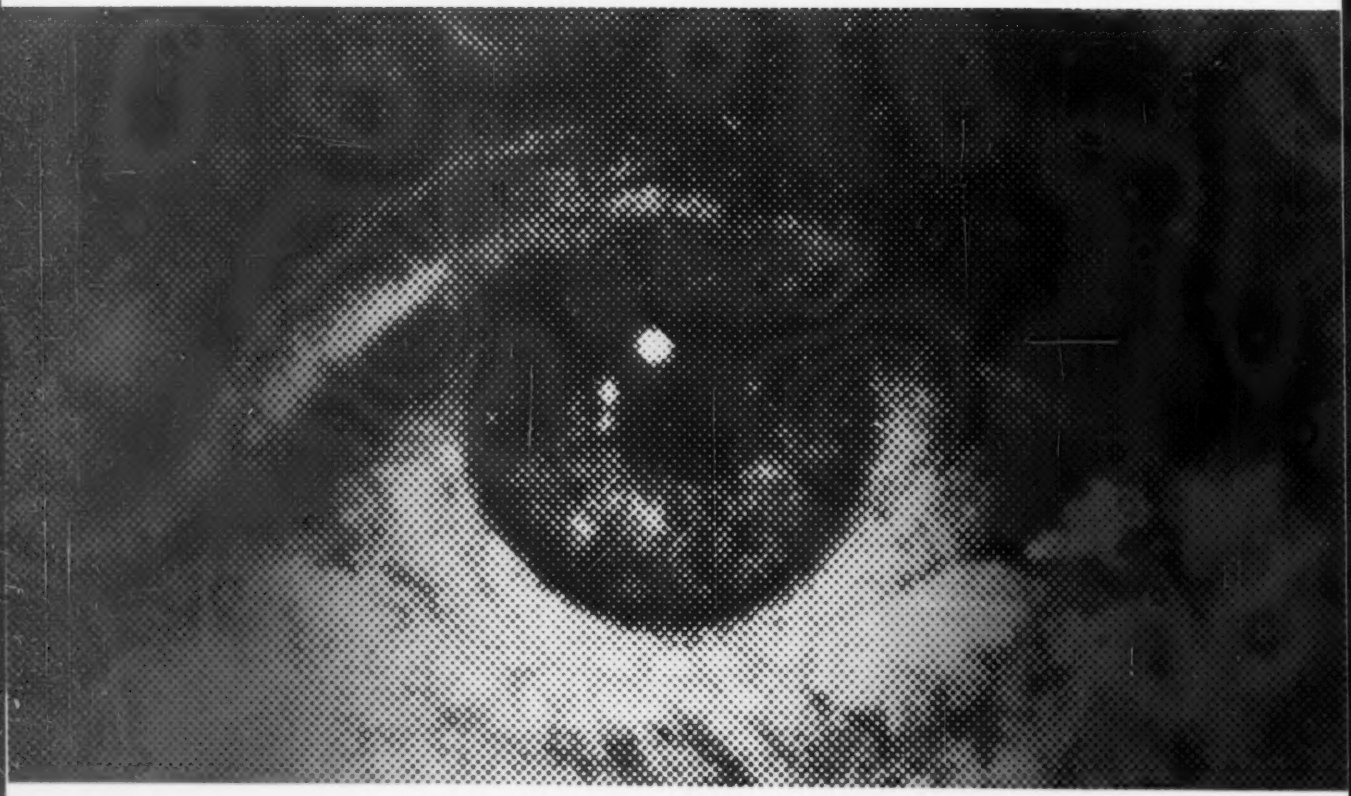


Research-Cottrell

RESEARCH-COTTRELL, INC., Main Office and Plant: Bound Brook, N. J.
Representatives in principal cities of U.S. and Canada

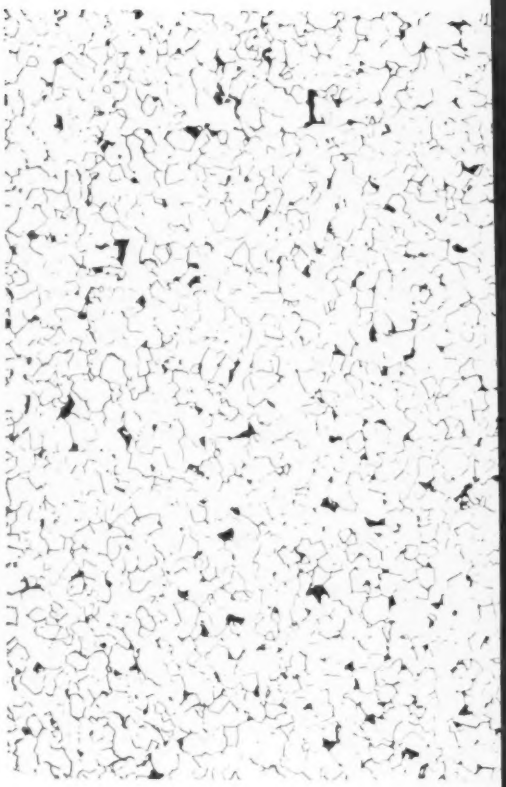
RC-219

This mark tells you a product is made of modern, dependable Steel.



What you see can't hurt you—At the right is a section of USS National Electric Welded Tubing magnified 100 times with a metallograph to check for weld flaws—and there aren't any here. You can't even see where the tubing ends and the weld begins. Their grain structure is identical. (The weld runs vertically down the center of the picture.) Even microscopic flaws are easy to spot on the acid etched surface. We also check the microstructure, cleanness, and grain size of the weld. Welded tubing must be flawless so we don't depend on visual inspection alone. To be absolutely sure, we test our tubing far beyond specifications. To do this we have designed new and more accurate testing equipment. Some of this test equipment even tells us when it is not working properly. We go to extremes to be sure that USS National Electric-Resistance Welded Tubing will stand up in critical pressure and mechanical applications that demand the utmost in strength, dependability, and uniformity. If you'd like more information, write National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

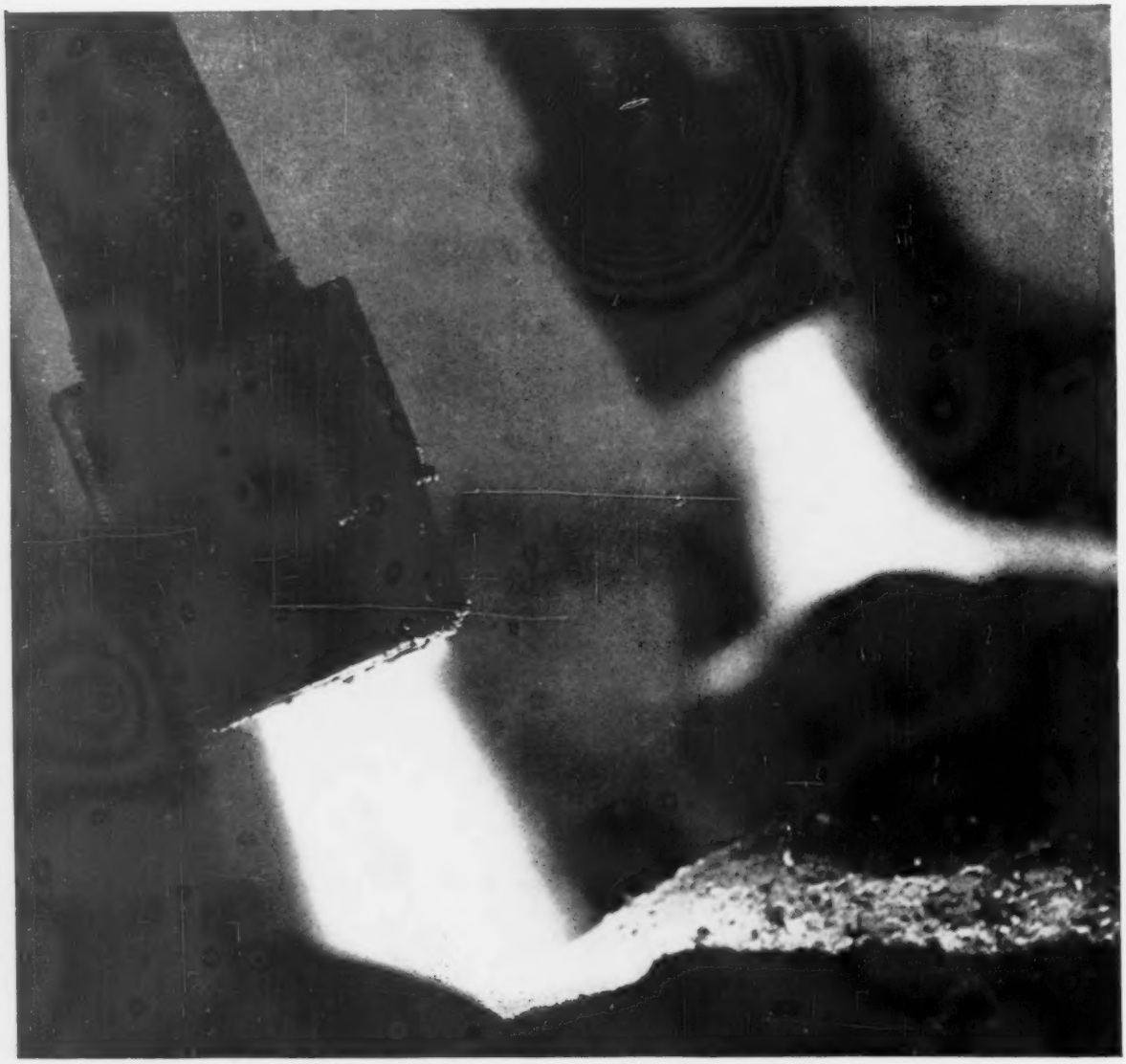
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National Tube Division of United States Steel

USS

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Supply Division, Chicago
United States Steel Export Company, New York



Gas is easily regulated to make sure that molten metal is at proper temperature for pouring.

The precise control of GAS expedites automated pipe casting

Salem Pipe & Iron Company, Bridgeton, N. J., produces high quality spun soil pipe, using the most advanced, automated method of centrifugal casting. In their heat processing, they rely on the instant, intense, accurate heat of gas.

Gas preheats their combustion air . . . melts iron in the cupola . . . heats the pouring ladles to prevent chilling of molten iron . . . completes combustion of cupola fumes in an after-burner to eliminate air pollution.

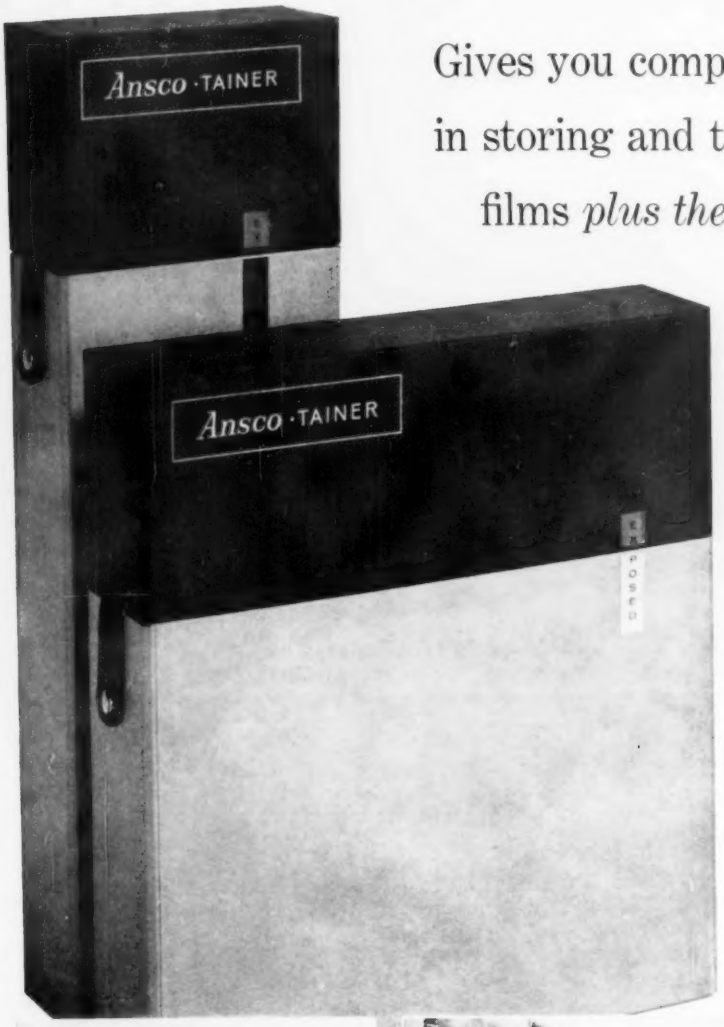
Why the choice of gas heat? Precise temperature control! Gas develops the right heat rapidly and maintains it accurately. Delivers clean, safe heat. Adapts most easily to automatic temperature control. Offers unbeatable economy.



You'll find that gas is good business for you in all types of heat processing – and for space heating. Call the Industrial Sales Engineer at your local Gas Company. *American Gas Association*

FOR HEAT PROCESSING GAS IS GOOD BUSINESS!

NEW ANSCO-TAINER!



Gives you complete safety in storing and transporting X-ray films *plus these important extras:*

1. Lightweight—strength without bulk.

2. Light-tight—completely light sealed.

3. Superior construction—protects film against artifacts.

4. Durable—Long-wearing plastic finish resistant to stains.

5. Perfect size—carries just the right amount of film needed to do the job . . . will hold a 75 sheet interleaved or 150 sheet non-interleaved Pouchpak from a Superpak or Bulkpak® carton.

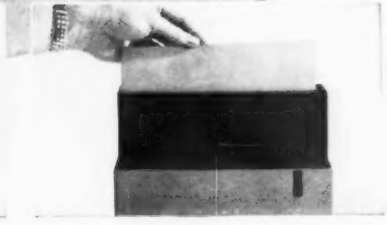
6. Economy—costs far less than expensive suitcase containers.

7. Easier darkroom handling—cover opens and closes with ease in dark.

But the new ANSCO-TAINER has to be seen to be appreciated! Handsome, versatile, the perfect darkroom-to-equipment-area X-ray film carrier. Pack it, pick it up and go . . . no bulky cases when bulk is unnecessary. As protective and as safe for your film, as the darkroom itself! Anseo, Binghamton, New York, A Division of General Aniline & Film Corporation.



Versatile—the Ansco-Tainer is the right size for most jobs. Holds a complete Pouchpak from a Superpak or Bulkpak carton.



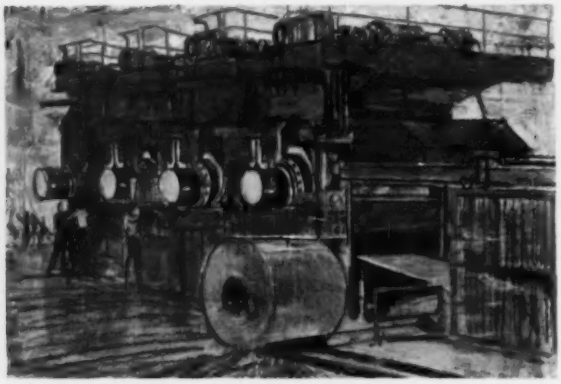
A few sheets or a single sheet . . . complete safety for exposed or unexposed film, with all the convenience of total portability.

Ansco

X-ray



GENERAL ELECTRIC AUTOMATION SYSTEMS provide scientific production control. Computerized order editing, production scheduling, material ordering, and dispatching are automatically integrated with production processes.



GENERAL ELECTRIC AUTOMATION SYSTEMS automatically control strip gage in tandem, single-stand, and reversing cold mills. New for tandem cold mills is automatic threading and set-up to reduce operating time and scrap losses.

Leadership in Industrial Automation

General Electric Is the One Source for Automation of

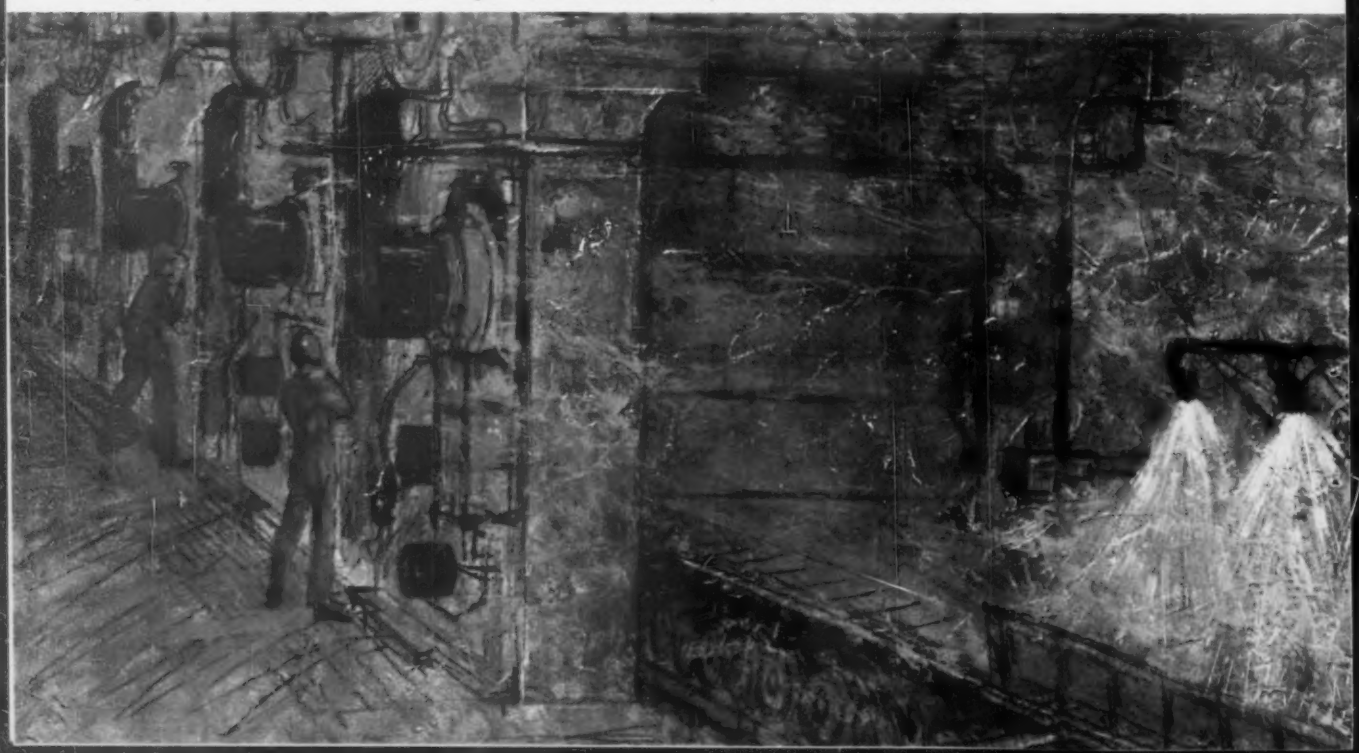
Advanced automation technology is one good reason why General Electric is your best source for complete automation, but it's not the only reason:

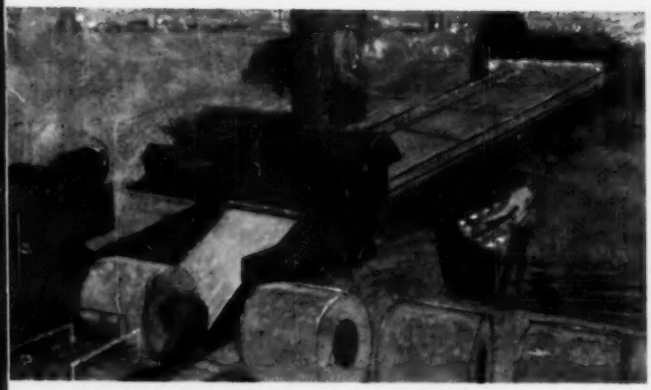
No other single manufacturer provides such a complete array of superior electrical system components. In fact, you can get from this single source—General Electric—every component *and* the system-engineering know-how to assure that your management decisions have a more immediate and profitable effect on product, costs, and mill utilization.

Long and close association with your industry has provided General Electric with unequalled experience in the design and manufacture of basic electrical systems for almost every metal-producing process. This relationship has also provided General Electric with a full knowledge and appreciation of your industry's processes, problems, and goals.

Industry's needs pace General Electric's progress—progress which has produced such firsts as: amplidyne-regulated power systems for reversing hot mills, automatic gage control for cold and hot strip mills, punched-card programmed reversing hot mills, "Top-Forward" main drives, and computer-controlled hot strip mills. Now, continuing progress is providing completely-automated production systems for virtually every metal-producing process. *And General Electric can link these processes into an over-all system of integrated automation for centralized control of your whole business.*

GENERAL ELECTRIC AUTOMATION SYSTEMS reduce mill equipment abuse. In reversing hot, hot strip, billet, structural, and bar mills, rolling dimensions are consistently held within desired tolerances.





GENERAL ELECTRIC AUTOMATION SYSTEMS protect high value of your product during shearing and classifying, side trim, and recoil line operations. Automatic inspection increases classifying speed and utilization of end product.

Your Entire Plant

For full details on General Electric's plan for complete automation, contact your nearest G-E Sales Engineer. He is ready to bring the unequalled system-engineering experience and product diversification found *only* at General Electric to bear on your automation needs. Meanwhile, if you'd like a complete set of these paintings, in color and suitable for framing, just write over your company letterhead to General Electric Company, Section 659-06, Schenectady 5, New York.

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GENERAL ELECTRIC AUTOMATION SYSTEMS provide maximum product consistency. Computer control and automatic sensing applied to blast furnaces, oxygen converters, sinter plants, and open hearths increase yield from given input.

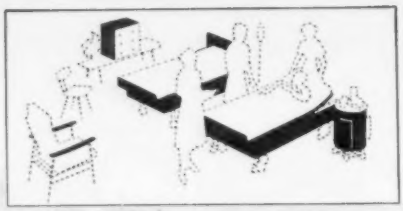


GENERAL ELECTRIC AUTOMATION SYSTEMS provide discreet handling of materials in process. Automatic control of cranes, conveyors, stacking equipment and ore unloaders means precise, safe, timely handling.



GENERAL ELECTRIC AUTOMATION SYSTEMS provide more continuous operation for annealing, tinning, galvanizing, and pickling lines. Computer control assures proper conditioning of strip to customer specifications.

CLAD-REX VINYL-CLAD METAL USED IN HOSPITAL FURNITURE





Clad-Rex vinyl-clad metal can add to the sales appeal and profit of <u>your</u> product, too!

"Our new line is the greatest advance in patient-room furniture in hospital history", says American Seating of Grand Rapids, Michigan. "Two years of research, development and testing were put into these new products." They are made with Clad-Rex vinyl-clad metal, because it has unusual sales appeal as well as special corrosion and abrasion resistance. Fabrication, according to American Seating, is much the same as with bare sheet metal—except for finishing, which is not needed!

See how Clad-Rex vinyl-clad metals can help your product by contacting Simoniz Industrial Products, 11506 West King Street, Franklin Park, Illinois (Phone Gladstone 1-2323). Ask for Report 6101, "How to use Vinyl-Clad Metal in Commercial Furniture".

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CLAD-REX VINYL-CLAD METALS • **SIMONAIRE** FOAMS AND INDUSTRIAL CHEMICALS
SIMONIZ RESEARCH, DEVELOPMENT AND ENGINEERING

Metalworking Newsfront 6

THE FTC RULING AGAINST LURIA Brothers is not expected to upset scrap purchasing patterns. Chief effect of the ruling would force steel companies named to buy 50 pct of their scrap through sources other than Luria. But Luria could still compete, say scrap men. Others would be forced to match Luria's prices, delivery and quality. Appeals are expected, and the FTC may reverse or modify the ruling. One effect could be more bidding for scrap, with less secrecy on price information.

A RISE IN INVENTORIES in the coming months is forecast by J. H. Hoagland, National Assn. of Purchasing Agents analyst. He cites three stock-building forces: Increased demand for final products, longer lead times, and anticipated price increases.

WANTED: NEW CONSUMER PRODUCTS. This was the sign hung out last week by Sears, Roebuck Co. The company formed a new Products and Business Development Committee that will be on the lookout for new ideas in products, designs and materials. Background: Many best sellers didn't exist a few years ago. More are wanted.

THE 1961 MARKET FOR METAL CURTAIN WALLS will be about $400 million, says D. S. Miller, marketing head of Kawneer Co. This is a 5 pct rise over 1960. J. P. Jansson, market development manager for Olin Mathieson Chemical Corp's Metals Div., figures 15 pct of all non-residential exteriors put up last year were clad in metal curtain walls. He sees this at 25 pct by 1963.

JAPAN STILL WANTS MORE U. S. MACHINERY. Toshiki Sakurai, president, Mitsubishi Nippon Heavy Industries, Ltd., and now in the U. S., told the IRON AGE: "Japan's big need in U. S. products is machinery. This is the growing market in our country."

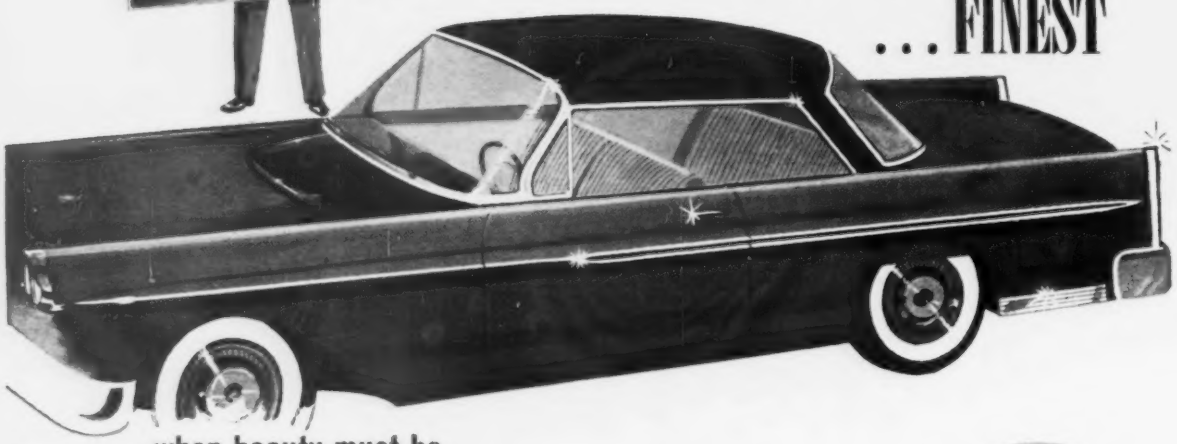
A NEW CONSUMER "DEMAND MIX" is causing a slow pull-out from the recession as business learns to adjust to it. This is the view of J. R. Bunting, a Federal Reserve Bank economist. He says the war-born demand for houses, cars, and appliances is slipping as people look for schools, sewers and highways.

SCHOOLS OFFER A BIG AND GROWING MARKET. Of the record $22 billion spent on education last year, almost $3.5 billion went for buildings and equipment. This business is reported to offer high replacement sales as facilities reflect drastic changes occurring in educational methods and mediums.

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. . . FINEST



. . . when beauty must be bright and durable, many products are made as they should be with

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FIRST to guarantee—unconditionally—that its product would successfully survive the Automotive Industry's severe tests for brightness and corrosion-resistance . . . tests the product did pass, a performance that has caused thirteen competitors to try to copy Wallingford's unique method, a method that remains unmatched; and a performance that convinced one major automotive company to specify Wallingford Type 201 Bright Annealed exclusively!

FOREMOST in total Bright Annealed tonnage produced, in installed capacity for producing it, and in years of research, development, and application experience . . . eleven of them rewardingly spent in the refinement of this super functional and decorative material.

FINEST . . . our claim that Wallingford Bright Annealed is the finest is repeatedly reinforced by our customers' outspoken praise of it. Ask them. References willingly supplied on request.

And ask us how Wallingford Bright Annealed can enhance the beauty of your product, endow it with high corrosion resistance, and greatly reduce your finishing costs. Describe your application and we'll provide specific recommendations.

Progress in Metals

THE WALLINGFORD STEEL CO.

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MAXWELL: "A healthy, continuing improvement."



BUDD: "We have reached the turning point in the recession."



HALLOWELL: "The time to start increasing inventories is past."

Industry's Decision Makers Say The Worst Is Over, But—

The decision makers in metalworking temper optimism with caution as they evaluate the uptrend.

In this series of IRON AGE interviews, metalworking executives give their views on the business outlook for the short and long term.

■ The men who will make the vital business decisions this year are taking a close took at the new upturn in the economy.

They are examining their customers' inventories down to the last item on the shelf. They are taking day-to-day readings of the Washington climate. They are paying close attention to every international rumble. No indicator goes unnoticed by the men whose business judgments will prevail.

Men of Decision—Who are these decision makers? They are the men in key executive positions. It is on their judgments that the vital decisions of retrench or expand, spend or conserve, will be made. Their evaluation of their company's profit position will have a lot to do with whether the new recovery will continue to gain—or whether it will be another disappointing false start.

On the basis of this searching series of interviews by IRON AGE editors, this conclusion can be reached: Metalworking's decision makers are hopeful and optimistic. But their hopes and optimism are tempered by caution.

Move Ahead — In spite of the caution, most executives indicate their business decisions will still be controlled by the need to move ahead in manufacturing technology, new product development, and aggressive marketing.

A good example is the attitude of **A. R. Maxwell,** president of **Pittsburgh Steel Corp.** A comparatively small steel company by the standards of the giants, Pittsburgh Steel failed to show a profit last year.

But Mr. Maxwell last week indicated his company is considering radical changes in its steelmaking facilities. It will not wait for the market to bring the company out of the doldrums, but will move to meet changing conditions.

Order Improvement—He reports a definite order improvement in the past few weeks. "We feel it's not going to go through the roof, but there is going to be a healthy, continuing improvement," he told The IRON AGE.

A little gunshy after most steel executives missed their 1960 predictions by a wide mark, Mr. Maxwell reserves his predictions for the second half of the year. But he points out that from 30 to 35 pct



LANPHIER: "Business is best in the Southwest."



BUDDINGTON: "We find a mild optimism among our customers."



WILEY: "Improved business conditions for the second half."

of the steel shipped in a given month is ordered during that month. This makes advance forecasting a dangerous thing for steelmakers.

Machine Tools—In the depressed machine tool business, restraint is the word. But there is more than a little hope there too. Says **W. K. Bailey,** president, **Warner & Swasey Co.,** Cleveland: "Practically all business prognosticators, including government specialists, seem to agree that industrial production is about to improve. The optimism that this situation creates has, in my opinion, already created an improvement in machine tool buying, which has been at a very low level.

"If this greatly-increased optimism among the buyers of machine tools is followed by actual and continuing improvements in industrial production, there should be a very decided and continued improvement in machine tool business throughout the year.

Depreciation Factor—"My estimate would be that we may have as much as a 20 pct increase in orders and shipments, and that the business will be operated more uniformly throughout our industry.

"Action by the government to provide more realistic depreciation allowances will contribute to this trend, partly because of the relief granted, but also because it will be a positive indication that the government recognizes the importance of industries' problems."

Worst Over—H. P. Ladds, president, **The National Screw & Manufacturing Co.,** says this: "As do many other businessmen, I feel that the worst is over, we have hit the bottom, and are on the way up. The balance of the year looks as though we may have a slow but steady improvement.

"Our own industry, manufacturers of industrial fasteners, has had a very rugged past year. Constantly increasing costs and fierce competition, resulting in low prices, coupled with low volume, have made it almost impossible for our industry to show a profit.

"Any increase in volume, of course, will help, and I feel that this condition will prevail, and from now on the year should be better than the comparable period of 1960."

Fiscal Auto Year?—One area of business vital to all metalworking is the auto industry. **R. J. Eggert,** marketing research manager, **Ford Motor Co.,** was asked his opinion of the auto sales outlook. He says:

"It now appears highly probable that new car deliveries in the U. S. will be in the neighborhood of 6 million for the year ending June 30, 1961, and will approach this figure for the calendar year."

Mr. Eggert suggests the use of the fiscal rather than calendar years to place fluctuations in recent car sales in perspective. "When using calendar years, variations in sales from year to year often reflect variations in the supply side as much as changes in demand," he contends.

Mildest Recession—"This mildest of the post-war recessions has resulted in a decrease of about 400,000 sales from the year ending June 30, 1960. Improvement in income and employment as the result of built-in stabilizers, the continued growth of the economy, and moderate expansion of government programs, will more than recoup this loss. With record employment, readily available credit, and improved confidence, Americans can be expected to buy about 6.8 mil-

lion new cars in the fiscal year ending June 30, 1962."

H. Thomas Hallowell, Jr., president, **Standard Pressed Steel Co.,** Jenkintown, Pa., points out the efforts of continuous change. "Things have always changed before and they will continue to change. We feel at this time that it is extremely likely that our economy will go up. After all, when it starts up, it's not going further down—that in itself is most encouraging.

Inventory Buildup—"As far as Standard Pressed Steel is concerned, we feel people are using up their inventories of metal parts and we have already noticed a distinct uptrend in our orders, reflecting this situation. Never before have so many of our customers sent us so many small orders each day. The time to start increasing inventories is already past. Lower costs are attainable only when companies operate with proper inventories."

T. H. Lanphier, Jr., president, **Fairbanks, Morse & Co.,** says his company "feels more optimistic than we did four months ago." Pointing out that his company did little better than break even last year, he nevertheless is confident of a profit this year, "maybe a good one."

Regional Analysis—"Right now, sales are running about 10 pct over last year's rate," Mr. Lanphier says. "Business is best in the Southwest; with West in second place; the Midwest third; Southeast fourth; and probably poorest in the northeastern section of the country," he points out with a regional note. "We look for the present rate of acceleration to continue through midyear, then probably taper off somewhat in the final quarter of the year."

Back in the steel industry, **Robert M. Buddington,** vice president, sales, **Inland Steel Co.,** comments: "We're experiencing a steady, mild improvement, as others seem to be doing. As to the immediate future, the action the automotive companies take as to their production schedules for the next few weeks is important. Not only because of its direct influence on steel and other suppliers, but the effect it will have on the thinking of people generally. We find a mild optimism among our customers and believe orders will continue to show modest gains for the present. The improvement is across the board. . . ."

Turning Point Past—Edward G. Budd, Jr., president, **The Budd Co.,** says, "The mild, but distinct upturn in several areas of the economic activity during the last few weeks of March would indicate that we have reached the turning point in the business recession."

EGGERT: "6.8 million cars in fiscal year ending June 30, 1962."

But he questions whether this is merely a seasonal spurt or the beginning of a real and sustained growth. "On the whole," he says, "I am inclined to the belief that we will see a gradual, but continuous, improvement in the months ahead. I'd say the economy will continue to rise slowly."

William J. Wiley, vice president-finance, **SKF Industries, Inc.,** notes that "a good look at several business bellwethers shows the nation is moving out of the recession. Surveys of plant equipment and expenditures show improvement for the last six months of 1961.

BAILEY: "A decided improvement in machine tool business."

"Government spending is scheduled to increase. New orders received by durable goods manufacturers appear to have passed the low point, and prices of stocks give evidence of the sharpest recovery in several years. Taken as a whole," Mr. Wiley says, "the improvement in these areas heralds improved business conditions and operations in the second half of this year."

LADDS: "We have hit bottom and are on the way up."







Kaldo Process Makes U.S. Debut

Sharon Steel Will Install Two Oxygen Furnaces

Steelmakers in the U. S. will soon get a first-hand look at the Stora Kaldo process.

Sharon furnaces provide full test of oxygen steelmaking for specialty products.

By G. J. McManus

▪ This country's first basic oxygen steelmaking vessels of the Stora Kaldo type (The IRON AGE, Oct. 18, 1956, p. 126) will be installed by Sharon Steel Corp.

Due for completion in the fall of 1962, the new plant will be located at Sharon's Roemer Works, Farrell, Pa. Dravo Corp. will design and build the facility. Cost will be $17.5 million.

Professor Bo Kalling, director of research for Stora Kopparsbergs Bergslags, A. B., will serve as a consultant to Sharon and Dravo during construction and early operation of the plant.

Two Furnaces at First—Sharon will install two furnaces initially. They will have capacity of about 1 million tons. The company says this output could be doubled by addition of a third unit, which is provided for in designs.

Oxygen for vessels will come from an on-site plant to be built and operated by National Cylinder Gas Div., Chemetron Corp. The oxygen facility will be of the Linde-Frankl type, sold in this country by Dravo.

Deep Interest—The move is attracting wide interest for at least three reasons:

It gives American steelmakers their first chance to see the Stora Kaldo process at work under domestic conditions.

It provides a large chunk of modern capacity to Sharon, which has been a high cost producer.

It provides a full-scale test of oxygen steelmaking for specialty products.

This country now has 4.1 million tons of oxygen steelmaking capacity. Another 5.1 million tons is being added. The spectacular performance of vessels now operating makes it certain the oxygen method will play a dominant part in expansion and replacement programs.

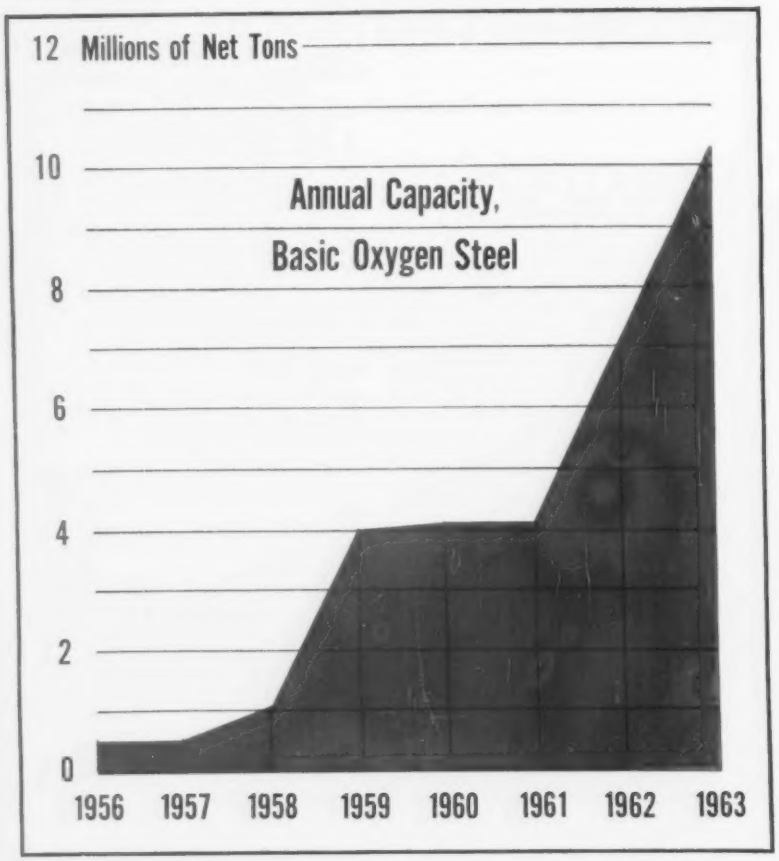
First in U. S.—Up until now, all furnaces installed or ordered in this country have been of the LD type, to which Kaiser Engineers claim American rights. All have been used largely for standard, low carbon steels.

Stora Kaldo experience has been limited to a small installation in Sweden and to two 110-ton vessels at Sollac, France. The French units have been in full operation less than a year. They are running on high phosphorous ore.

In announcing the decision to go to the Stora Kaldo process, Sharon stressed quality and compatibility factors.

"As a result of carefully controlled quality tests over the full range of carbon steel analysis produced in our openhearth furnaces and in electric, LD, and Stora Kaldo furnaces," said J. A. Roemer,

Growth Ahead for Oxygen Steel



board chairman, "we concluded that steel made by the Stora Kaldo method would best supplement our present range of specialty steels."

Fits in Well—Mr. Roemer said the process would fit in with existing facilities at Sharon and with the company's product line, present and future. He did not amplify the statement on facilities, but he did cite heat economy, temperature control and metallic yield as "critical advantages of the Stora Kaldo process." He pointed out extra heat provided by full carbon oxidation meant relatively large quantities of scrap could be melted.

On the matter of quality, Sharon produces a large percentage of high carbon specialties. The company feels Kaldo will meet the control requirements of this kind of operation.

Close Control Possible — "With the range of materials used at Sharon and for the steel grades we now produce and for the grades to be produced," said Mr. Roemer, "Stora Kaldo will provide in the finished product extremely close control of phosphorus, sulphur, nitrogen, oxygen and non-metallic inclusions."

The potential of oxygen steelmaking for smaller steel companies shows up in Sharon statistics. At a cost of about $17 an ingot ton, the mill is providing modern facilities equal to half its existing capacity. Addition of a third furnace, presumably at a much lower cost, would give a plant that could completely replace present openhearth furnaces.

Others Interested — Other producers have shown strong interest in numbers like this. A. R. Maxwell, Jr., president, Pittsburgh Steel Co., said last week his company is considering radical changes in its steelmaking facilities. Mr. Maxwell did not specify any particular process.

One of the largest mills in the country is said to be leaning toward the Stora Kaldo method because of flexibility with scrap and hot metal.

Bearings Prices: A Rise Coming?

SKF Industries, Inc., a leading bearings producer, will be raising prices this summer.

Other producers may follow the trend. Generally, the bearings market is firm and sales are starting to pick up.

▪ SKF Industries, Inc., a major maker of bearings, has announced a price increase.

This is not particularly unusual. The company's vice president, sales, S. H. Smith, explains: "Operating efficiencies and economies have not offset the increased cost of wages and materials." And bearings prices have remained basically unchanged over the past two years.

What is unusual is that SKF says the price hike will come with "shipments in the late summer." In other words, SKF prices will rise in about four months.

Others Following?—The rest of the industry is holding back. A sales executive of one company frankly doesn't know if his company will go along or not. A general sales manager for another bearings maker, when asked about the price picture, replied: "Prices seem to be reasonably firm although there is some indication of possible increases before the end of 1961."

The recession appears to be over for the domestic bearings industry. Business in the first quarter was up over the final quarter of 1960. One executive says incoming business during the past six months "has shown fairly significant increases."

Low Ebb Past—Even those who insist you can't call improved business a trend yet, admit the low point has been passed. But it's evident buyers are not yet rebuilding the inventories they slashed to the bone in 1960.

Another bearings official notes, "Most of our customers are operating on an absolute minimum inventory and are usually demanding faster deliveries."

There is also the feeling that stocks have reached the point where purchases must be made to meet production requirements. "This is evidenced," according to one producer, "by a spasmodic upturn of small orders which, in the past, preceded an upturn in business."

Other factors—There are other factors involved in the bearings market. For one, imports are not generally crowding domestic producers. The key here seems to be reliability and service.

In fact, the trend seems to be in the other direction. One executive says his export business, particularly to Europe, is doing well. He explains that the boom in Europe has strained the European bearings industry. "In some cases we can beat their delivery, even to their close-by customers by as much as one year."

Many in the industry believe the improvement in the economy as a whole will be wide-felt by the bearings industry. One bearings maker notes: "The curve will show an improved trend in the latter part of the present quarter and then by fall, an appreciable increase."

Sales Programs—With this in mind, most bearings companies have their own programs to increase sales. And, there are new products. SKF, for example, has a new "Aerospace" bearing which it says will operate at 1000°F without normal lubrication.



EXOTIC: Midwest Foam Products Co. shows special packing for delicate switches made by Micro Switch.



BASIC: A new pail, undergoing crush test, is introduced by U. S. Steel. Less storage space is one asset.

Better Package; Bigger Profits

Over $17 billion a year goes into wrapping U.S. products.

Packagers meeting in Chicago agreed proper packages, though more costly, can boost profits. By K. W. Bennett

■ Wrapping U. S. products is a $17 to $20 billion annual expenditure. And 10 pct of every manufacturing dollar goes into packaging the finished article.

Visitors at the National Packaging Conference in Chicago last week learned that the packaging engineer must cut his company's packaging bill by 7 pct, every year, to keep even with higher wrapping costs.

Profit Booster—Despite advancing costs, proper packaging can boost profits. Consultant T. P. Wharton points to studies by the Army Quartermaster Corps. They indicated palletized packaging can mean 50 pct more goods handled by 25 pct fewer men.

General Electric Co. packaging specialist S. L. Rowley, Jr., reports a new wood crate cut one division's packing time by 85 pct. It also reduced shipping weight and, therefore, freight cost for the package, by 75 pct.

In the redesign of a corrugated fiberboard carton, GE cut freight weight by 33 pct, packing time by 22 pct.

Three Trends — Reports from manufacturers and distributors suggest these three major trends:

1—Greater use of fiberboard cartons. With the advent of a carton that loses as little as 10 pct of strength after being submerged for 24 hours, fiberboard is moving into new areas. Perishable foods is one. Though it's been with us since World War I, the versatility of fiberboard cartons continues to grow.

2—The use of packing materials, like excelsior, is being cut by foamed plastic, or redesigned packages that do not require additional packing. Total weight costs and packing time can be cut.

3 — Distributors of industrial goods, following the example of consumer goods, are designing packages with customer appeal. While particularly noticeable in goods sold through jobbers and retailers, this is developing across the entire industrial scene.

Customer Counts — Says A. D. Baldwin, Cleveland Graphite Bronze Div., Clevite Corp., "Our customer is the jobber, and we package for his convenience and assistance." Clevite bearings are now packed in "engine sets." This reduces the number of parts numbers a jobber must keep in his records. When he

sells only part of a set, this "educated" package shoots up a tab which indicates it is a "broken set," and that he must reorder.

Clevite held off on packaging sets of engine bearings, because the move would boost jobber inventory values by 12.5 pct. It forgot cost, however, when jobbers said the idea was so convenient that it more than offset the increased tieup of inventory dollars.

Concludes Mr. Baldwin: "If you are doing something the same way you did it five years ago, it must be wrong."

Pumps Unveiled—Vice President John C. Myers, Jr., of F. E. Meyers & Bros. Co. reports his pump company designs cartons to display the product. Reasoning that a jobber has to cut open the carton to show the product, Myers & Bros. designed the carton so that it became its own display counter.

Myers functional carton liner was redesigned so that it could be pulled out for use as a display stand. This idea originated with a promotion-minded jobber. The company created a point-of-purchase display package for the jobber field where none existed. The cost: An additional 3¢ per carton.

20,000 Parts—While emphasizing selling qualities, Myers must design its packages to handle 20,000 different repair parts that the company manufactures. While putting sales appeal into its wrappings, Myers managed to cut its package designs from 65 models in 1952 to 27 at present.

Here's How—Rules of thumb in packing design:

1—Make packages easy to open. What seems like a minor point actually reduced sales for at least one package conscious company.

2—Make the contents easy to identify, not just with trademarks, but with model number of contents.

3—Design them for ease in handling, including hand-holds if it will help.

4—Build them strong enough so the customer can ease his own inventory problems by stacking.

Oxygen Spurs Move To Smoke Control

Oxygen steelmaking is booming smoke control business. Steel companies are probing dust collection systems. Air pollution laws are increasing.

By T. M. Rohan

■ Air pollution control equipment makers are enjoying their biggest upsurge in business in the wake of steel industry conversion to oxygen steelmaking. This process generates much more smoke, making air control fixtures almost mandatory.

"Less than 10 pct of the open-hearths and only about 4 or 5 electric furnaces have dust collecting systems now," says a leading builder.

Many Inquiries — "Most steel companies are studying dust collection systems. Our volume of inquiries and quotations has risen considerably in the last few months.

"Bag house type control equipment costs roughly about $150,000 per furnace. There's little to be gained by combining air from several furnaces through one bag house."

Big Dealers—Major companies in the steel furnace field are Dracco Div. of Fuller Co., Western Precipitation Div. of Joy Manufacturing Co., Wheelabrator Corp., and Research-Cottrell, Inc.

A host of others are in smaller dust and fume collecting equipment. Some steel producers with fabricating subsidiaries also are going into build - it - yourself programs, mainly to employ idle facilities and workers.

Newest Type—Dracco has just announced a new lower cost bag house type system. It cuts capital investment from a third to half, compared with conventional electrostatic precipitators.

This new type involves cleaning the glass-fibre collecting bags by a patented sonic method, rather than the previous shaking type or reverse pressure. Sonic cleaned bags—which act exactly like the bag on a home vacuum cleaner—have been used in cement, chemical and smelting plants and can extend bag life to over two years.

The first of these is going into Bethlehem Steel's Sparrows Point mill.

Tougher Laws—Going hand in hand with oxygen steel is a demand for more and newer air pollution laws. This calls for up-to-date systems. To fit them in, plant engineers, steel mills, foundries and chemical plants are doing some fancy layouts.

In Cleveland, Youngstown, and Buffalo recently, major controversies raged. But officials relaxed dust control rules in favor of relieving the more serious employment problem.

Putting It In—Finding a place for equipment is not always easy. In a new Ohio steel mill, the filtering equipment is being built 250 ft from the electric furnaces.

Exhaust gas from three furnaces up to 30 ton capacity each must be pulled this distance by three 300 hp fans to a bag house with 1056 dacron bags acting much like a giant vacuum cleaner.

Engineers expect increased life from the dacron bags. Where temperatures up to 500°F are to be handled, glass type filter bags are used. To loosen dust, pressure is reversed periodically.

More Coming—The new $150,000 Ohio installation is the first of several planned. Final cost is estimated at about $500,000.

Close-ups Of
INDUSTRIAL JAPAN

Part 5

Japan Must Export to Survive

Japan is a country that thrives on trade. It must import vast quantities of raw materials.

But it must also export vast quantities of finished products if it is to survive.
By Tom Campbell

■ Japan has many headaches in its foreign trade problems. It must—if it is to maintain its share of world exports—ship abroad more than $9 billion worth of goods by 1970, compared with $3.6 billion in 1960.

This will be far more difficult than appears on the surface. There must be peace in the world. There must be a steady growth in the incomes of highly-developed nations. And the national income in underdeveloped nations must advance sharply.

These are a few of the factors which do not show in the statistics which estimate the growth of Japan's export trade. Japan's import problems are also difficult.

A Hard Nut — The country is highly dependent on imports. Important foodstuffs, raw materials of all kinds, and manufactured goods will have to be imported in ever-increasing amounts. These have to be paid for by lower costs at home, more exports and more technical assistance.

At present, the growing strength of labor unions, the increase in wages and fringe benefits, and the life tenure of most jobs make lower costs a hard nut to crack. But it has to be done.

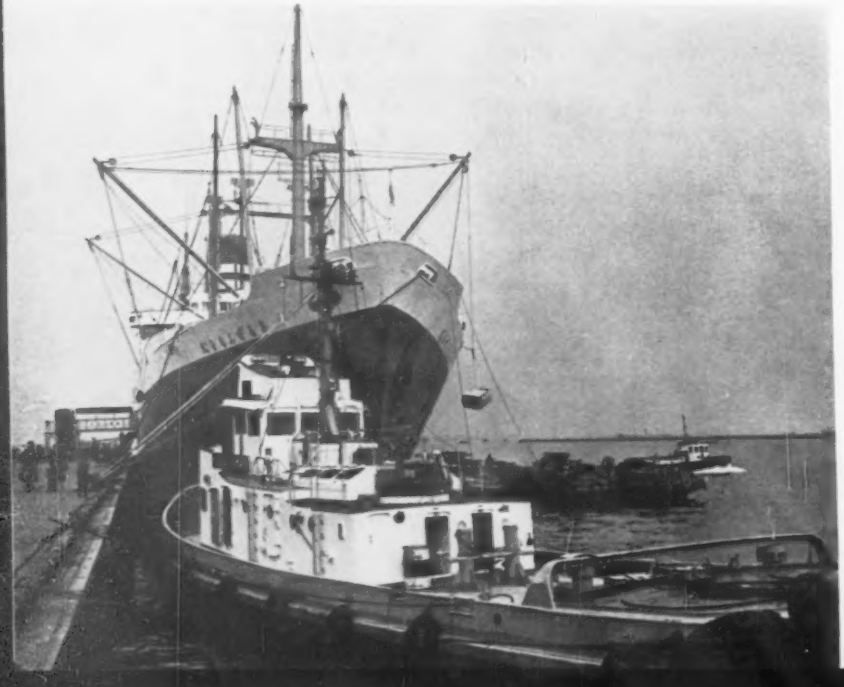
Looked at from the overall viewpoint, it does not appear that Japan's exports pose any strong threat to the U. S. It is true that on a tonnage basis Japan will increase its exports to the U. S. in the next 10 years. But as a per cent of the total, exports to the U. S. will show no change from the present.

Rising Competition—Of course that does not apply to specific areas such as cameras, radios, transistors, textiles and other so-called light machinery items. The exporting of those items to the U. S., Europe, Latin America, and to some Communist countries will be heavy. But heavy machinery such as steel plant machinery, chemical plant machinery and other industrial equipment will be exported to underdeveloped nations.

The problem that Japan faces is one of higher costs. Competition with such areas as India and Hong Kong has been and will continue to be intense.

Here again Japan must make strong efforts to gain more technical

SEA TRADERS: Japan's ships ply the oceans, stopping at ports all over the world to deliver finished goods and take on cargos of materials.



NEXT WEEK
RED CHINA

Red China's claims of great industrial progress must be qualified. The future is loaded with a lot of "ifs." In Part VI of this series of reports from the Far East, Editor-in-Chief Campbell sifts out the fact from the fancy.

knowledge. Yet restrictions often placed by the government on liaisons with American and other nations' companies are so severe that months and months of bargaining and negotiation must take place. Even then there is no assurance that the logic of the proposition will prevail.

Rising Costs—If there were days of Japanese foreign trade "dumping," that is no longer the case. Even in cotton goods exports, where Japan once supplied 75 pct of the U. S. imports, it now has but 25 pct. The rest has been gobbled up by Hong Kong, India, Pakistan, and other nations.

Part of Japan's loss of cotton textile markets in the U. S. was due to voluntary reductions in exports (in fear of legal restrictions). But part may have been due to the rising production costs in Japan compared with costs in other countries.

The Hard Facts—When one looks at the question, "Will Japan's exports present a danger to the economy of the U. S.?" it is quite hard to give even a semblance of a "yes."

For specific industries, and perhaps for specific areas, there may be some harm. But when have there not been dislocations due to imports or from technological changes? This is no argument, either, for encouraging Japan's trade with us or for limiting it. It is a case of hard facts: Japan—and other nations—expect to sell to the U. S., at least to the extent that they buy from us.

This may be a new idea to some Americans. However, it is clear to those who have been selling machinery and technical knowledge in Japan since it started on its upward march.

Need to Export—But Japan has its troubles too. It will not find it easy to meet the goals set up for exports. It will have difficulty breaking through the Inner Six and the Outer Seven in Europe. Japan also will have a hard time with some interests in the U. S. as it increases sales of light machinery items.

Still, the records, the studies and the absolute need to export, to cut imports, and to reduce manufacturing costs suggest the current estimates make a lot of sense.

Labor Shortage?—Japan's problem in foreign trade will be to keep labor costs from running away. This may be hard to do. The birthrate is about half of what it was in 1947. That means there no doubt will be a severe labor shortage in Japan in 10 years. There is no indication that there will be any change in the downward trend in births. In fact, just the opposite to what is happening in the U. S. is now taking place in Japan.

Japan has plenty of labor now. It is a strain on the economy to find jobs, raise pay, and take care of the pensioned—who leave their jobs when they are 55 years old. But in 10 years this will be reversed, according to Saburo Okita, a government economist.

Ambitious Goals—Japan hopes to increase exports of heavy industrial and chemical goods—so much so that estimate figures make even some Japanese gasp.

An increase of 411 pct over the 1956-1958 average and 339 pct above 1959 is expected. In terms of dollars, that means going from $1.4 billion in 1959 to $5.0 billion in 1970.

Much smaller is the increase expected for the lighter items such as textiles, light machinery, and food, drink and tobacco: 280 pct of the 1956-1958 average and 208 pct of the 1959 figure.

But in this total is a growth of 468 pct in the exports of light machinery over 1959. This includes cameras, radios, transistors and other smaller items which Japan is exporting in order to keep its balance of payments problem from getting too snarled.

Trade With Reds?—There has been some speculation that Japan will sharply increase trade with the

Trends in Japan's Exports

The Change Is in Volume, Not Direction

	1959		1970	
Exports To	Pct of Total	Dollar Volume (Billions)	Pct of Total	Dollar Volume (Billions)
North America	33.5	$1.21	33.7	$3.14
U. S. Only	30.3	1.10	29.9	2.79
Europe	11.2	0.40	12.1	1.13
Latin America	7.4	0.27	7.4	0.69
Asia	32.5	1.18	26.9	2.50
Africa	10.6	0.38	11.4	1.07
Australasia	3.5	0.13	3.3	0.31
Communist Nations	1.3	0.05	5.2	0.48

Communist nations, especially Red China. This might be true from a percentage standpoint, but not of much account dollar wise.

Japan now exports about 1.3 pct of its sales abroad to Communist nations. This is expected to rise to 5.2 pct of total exports by 1970. Even then, experts in government privately are pessimistic that such a figure will be obtained. Not only have the Communist nations little foreign exchange, but they cannot buy much of what Japan wants to sell because they have little if anything that Japan needs—except iron ore and coal.

Red China has shown little sign that it will sell Japan large tonnages of either ore or coal. Russia has shown no sign at all of any large scale offerings to Japan.

Bid for Leadership—Taking a look at Japan's international problems and its desire to reach a standard of living that will match Western nations (Japan hopes to go from a national per capita income of slightly more than $300 today to one of $800 by 1980), it is hard to see how Japan can "dump" much in the world market. It will be hard work to keep up with the growth of world trade. The most ironic twist of all is that wages and costs may, in the future, price Japan out of many markets.

The future of Japan's exports depends entirely on solving domestic growth problems. The greatest of these is the need for automation, better technology and a less cumbersome attitude towards foreign techniques and technical assistance liaisons.

But Japan bids to be one of the greatest trade leaders in the world in order to survive at home. Personal research suggests Japan will survive—as a strong capitalistic nation.

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FTC Scrap Ruling Hits Luria Brothers

Arrangements by which Luria Brothers & Co., supplied scrap to steel mills and for export have been called illegal and monopolistic in an initial ruling by a Federal Trade Commission examiner.

Principal impact on the scrap trade of the ruling, if upheld, is that steel companies named must buy 50 pct of their purchased scrap requirements from suppliers other than Luria—if suppliers can offer needed quantities at prices comparable to Luria's.

After 7 Years—The FTC examiner's ruling came about seven years after the original FTC complaint was issued. Another point of the ruling would force Luria to sell Pueblo Compressed Steel Corp. and Southwest Steel Corp., Pittsburgh.

The ruling will probably be appealed to the full FTC. The Commission can adopt the ruling, modify it, or reverse it.

Because of the complexity of the case, and the probability of extended appeal, the ruling had little immediate effect on the scrap trade.

Some factors that are being discussed include:

The ruling states that steel companies must buy 50 pct from other suppliers if they can meet Luria's prices. It does not mean Luria cannot compete for business, but that others must meet or exceed Luria's prices, quality and service.

Little Effect — It's doubtful if Luria now supplies more than 50 pct of the purchased scrap to many of the companies named.

On prominent scrapman told The IRON AGE that the pattern of scrap buying in a given area would not be substantially changed "even if the ruling was enforced today."

Furthermore, the complexities of the ruling are so great that the company itself would not comment, until it has "digested" the decision.

Certain Plants—It was also pointed out that the wording of the ruling indicated it referred to specific plants or divisions of the companies named, and would not necessarily mean the activities of the corporations as a unit.

Named in the ruling are:

Bethlehem Steel Corp. and two subsidiaries, Bethlehem Steel Co., Bethlehem, Pa., and Bethlehem Pacific Coast Steel Corp.; United States Steel Co.; National Steel Co. and subsidiary, Weirton Steel Co.; Colorado Fuel & Iron Co. and subsidiary, John A. Roebling's Sons Corp.

Phoenix Iron & Steel Co.; Granite City Steel Co.; Lukens Steel Co.; Detroit Steel Co.; McLouth Steel Co.; and several companies which buy scrap but are not included in basic steel.

Ethics Code Studied By Electrical Group

The National Electrical Manufacturers Assn. may develop a code of ethics.

At a meeting last week, the board of governors approved setting up a committee to study such a move. The board also discussed recent statements related to the subject by President Kennedy and the Attorney General.

Continuous Casting Test Plant Begun

Babcock & Wilcox Co. has licensed the first experimental continuous casting steel plant in the U.S. The agreement is with Roanoke Electric Steel Corp., Roanoke, Va.

To be ready next year, the new plant will cast 3x6- in. sq bars. It will be operated on an experimental basis under regular production and product application conditions.

Granite City Blows New Blast Furnace

Granite City Steel Co. blew in a large new blast furnace last week, the only one scheduled to be blown-in this year in the U.S.

The furnace was finished early this year. But low steel demand held back the blowing-in step.

INDUSTRIAL BRIEFS

Metallurgy Spread — American Powder Metallurgy Institute has formed a Cleveland section. C. R. Halverstadt, Kirkwood Carbon Corp., is chairman.

New Institute — Nineteen companies specializing in steel marking tools and dies used for identifying and coding have formed the Steel Marking Tool Institute, as a section of the Marking Device Assn. Eric Novak, of Cadillac Stamp Co., Detroit, is president.

Training Course — MetroLonics, Inc., Burbank, Calif., has formed a new technical training section, the Institute of Metrology. One-week courses in linear metrology are being conducted.

Sells Holdings—Pierce Industries of Indiana, Inc., has sold its Missouri subsidiary to Jefferson W. Mitchell, Jr., a former vice president. Pierce Industries of Missouri, Inc., operates Rupert Diecasting Co., Kansas City, and Gibbs Automatic Moulding Div., Henderson, Ky.

Rockwell Buy — Rockwell Mfg. Co., Atchison, Kan., has acquired Pushin'-Cushin', Inc., Perry, Kan., which makes hydraulic shock absorbing units for tractors.

West Coast Deal—Vinnell Steel, Irwindale, Calif., has acquired Independent Iron Works, Inc., Oakland, Calif. Combined capacity of both plants tops 5000 tons per month of structural steel, bridge girders and steel storage tanks.

American Planett — American Pipe & Construction Co., Monterey Park, Calif., has bought Planett Mfg. Co., Downey, Calif. It will become a division of Etiwanda Steel Producers, Inc., an American subsidiary.

Tool Trade — Fansteel Metallurgical Corp., North Chicago, has acquired Wesson Tool Co., Detroit, which includes Wesson Multicut Corp., Wesson Metal Corp. and Wesson Co. Wesson refractory metal cutting tool plants are in Lexington, Ky., and Brighton and Ferndale, Mich.

Midwest Purchase — Di-Acro Corp., Lake City, Minn., has purchased Seco Electronics, Inc., Minneapolis, maker of specialized electronic test equipment.

Dill Deal — Eaton Mfg. Co., Cleveland, has acquired nearly all the assets of Dill Mfg. Co. in exchange for 200,000 shares of Eaton stock. Both companies serve the automotive and transportation industries.

Sole Owners — Metal Hydrides, Inc., Beverly, Mass., has acquired full ownership of the Danvers sodium borohydride plant, formerly co-owned with the U. S. Navy.

Bostitch Gets—Calwire Products, Inc., and its sales organization, Calnail, Inc., Visalia, Calif., has been acquired by Bostitch, Inc., East Greenwich, R. I., stapling and stitching equipment manufacturer.

Piping Buy—Crane Co., Chicago, has acquired Midwest Piping Co., Inc., which operates plants in St. Louis, Clifton, N. J., Los Angeles and Houston. The transaction involves more than $18 million.

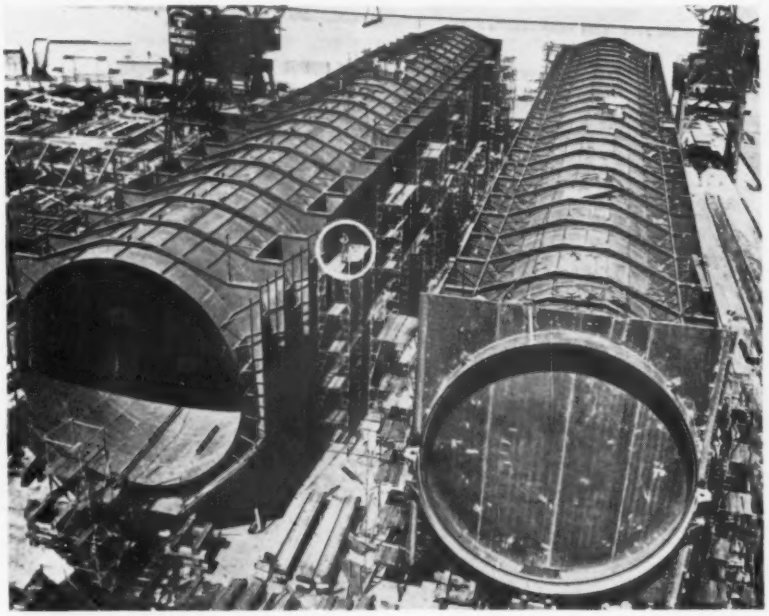
French Move—Black & Decker Mfg. Co., Towson, Md., has acquired a majority interest in a French electrical tool company, Socomeda, of Lyon, France.

Merger Plan—National Distillers & Chemical Corp. and Bridgeport Brass Co. are merging. National specializes in polyethylene resins, industrial chemicals and plastic film. Bridgeport makes brass, copper and bronze mill products.

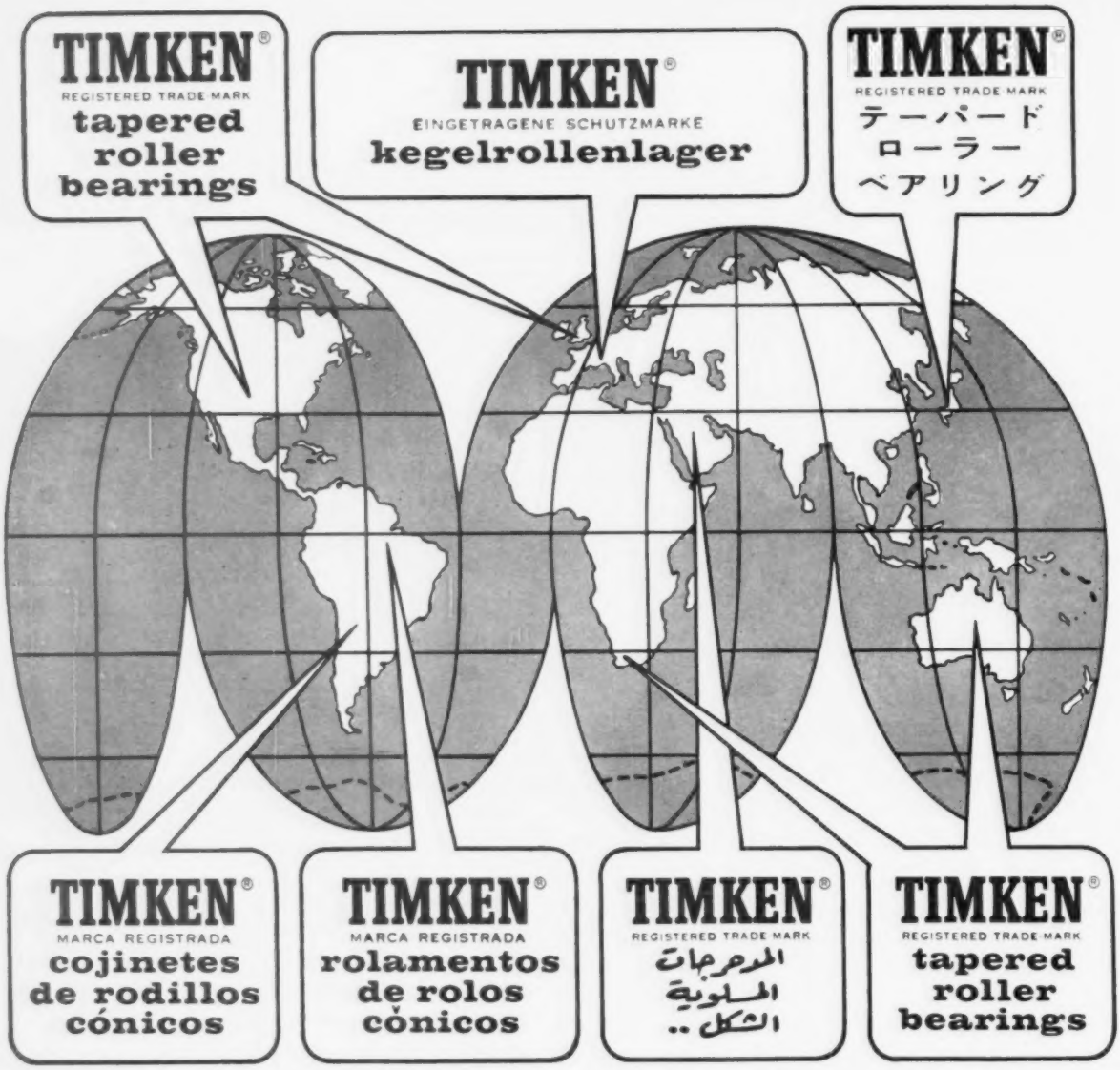
New Division — National Engineering Co., Chicago, has purchased Hydro-Blast Div. of the Guardite Co., a division of American Marietta Co., Wheeling, Ill.

Special Products—A new division for marine products has been formed by Kiekhaefer Corp., Fond du Lac, Wis.

Tunnel Sections Take Shape in Texas



TITANIC TUBES: Four Chesapeake Bay Tunnel sections, each nearly as long as a football field, are being built at the Orange, Tex., plant of U. S. Steel's American Bridge Div. Each tube section is 286 ft long.



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Costs "Creep" in Make-or-Buy

Developing sidelines, adding new products, or taking over supplier functions, can put idle capacity to work.

But before you plunge, make sure the new ventures are worthwhile, and keep track of all the costs.

■ If you have idle capacity, you're interested in ways to get it operating. There are temptations to branch out into new lines, to look for new products, or to take over supplier functions.

In times like the present, make-or-buy decisions are critical.

Don't Add Barnacles — Adding to your activities may help the profit picture. But watch out. **Such ventures, if not carefully thought out, may increase the number of business barnacles. They may contribute to "creep."**

Creep is defined by Robert L. Dixon, professor of accounting, Univ. of Michigan, this way: "The more or less gradual, unrecognized, cluttering up of business activity, together with a breaking down of company efficiency, a building up of fixed costs, and the undermining of potential profit."

There are many reasons, he notes in the U. of M's Business Reports, for making rather than buying. These are present when you must: Make sure of adequate supplies; safeguard quality; develop new lines to meet changing market conditions; keep the work force busy in times of slow business.

Saving Isn't All—But he cautions against adding activities solely on the basis of cost-savings. "In some cases," Dr. Dixon points out, "added activities are undertaken because they seem to offer cost-saving opportunities."

Usually the argument runs this way: Because a company has a plant and facilities, certain fixed costs already exist. These costs go on at about the same level whether the plant is fully used or not.

Therefore, the company can add odd jobs, sidelines, or service activities without increasing fixed costs. Only variable costs must be considered, and (where new equipment is needed), some added fixed costs. There are times when managers exclude overhead costs entirely when estimating the added expenses.

But Dr. Dixon warns, "Fixed costs cannot be ignored in making the produce-or-purchase decision."

Reason: They are bound to "creep" into the total cost picture. The added activities will intrude on the available capacity. Sooner or later this will lead to an actual increase in fixed costs, unexpected and possibly unrecognized.

The creep effect on fixed costs can develop in three ways:

The added activity may get out of hand—its growth may require more building space, more equipment and more salaried personnel.

Even if added interests are kept at a moderate level, when the main activity is increased, fixed-cost increases will show up.

Finally, even if the new venture is either kept level or increased, it will be more difficult to cut down on fixed costs if later reductions are needed.

How to Control Cost Creep

■ This being the case, what can be done to control creep?

Dr. Dixon makes several suggestions on avoiding it:

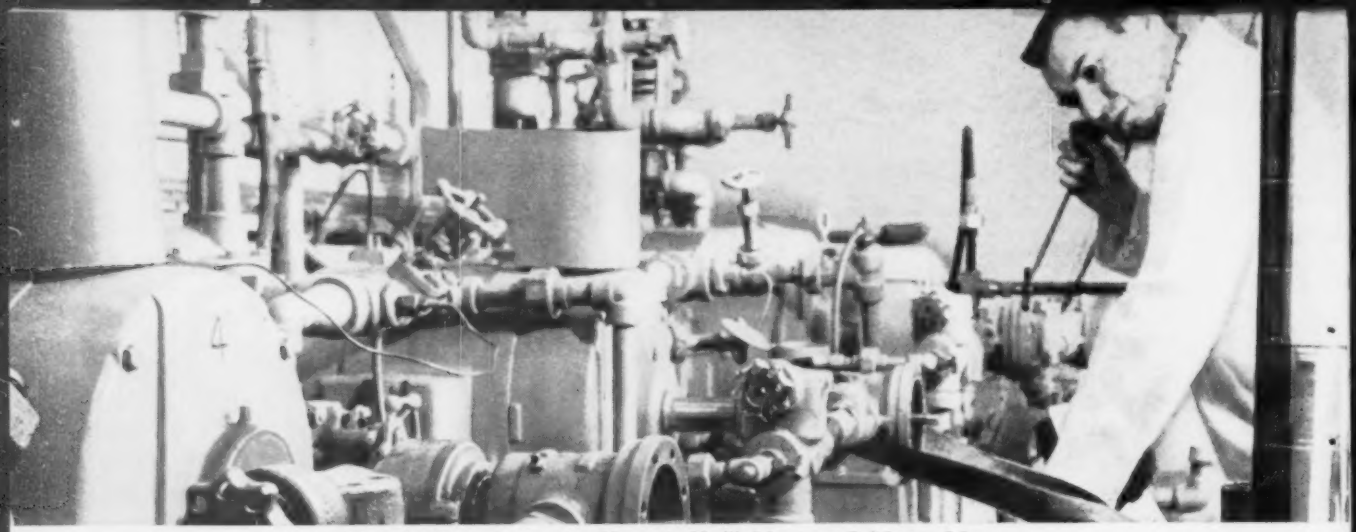
Before adding a new activity, weigh its merits (including cost savings) with other alternatives. Don't take on a minor cost-saving venture that might interfere with, or prevent, later expansion of the company's main operations for profit.

Include All Costs — Make sure the comparative statement of costs is complete and correct. Draw up a schedule of estimated costs of production. This should include more than a **full listing** of the probable added costs. It should also assign **all** overhead charges including administrative overhead.

If the company is already suffering from creep, what can be done to analyze the situation?

"Obviously a fringe activity should not be eliminated," says Dr. Dixon, "if the potential cost of getting the supplies, services, etc., from outsiders is so far in excess of the costs that over-all services would be diminished."

He recommends an "activity audit," giving a more or less continuous study of off-shoot activities to detect existing or potential creep.



Listening for pump chatter. Here—in Shell's Martinez, California, laboratory Shell Tellus hydraulic oils are subjected to the most demanding tests.

BULLETIN:

Shell presents a question-answer guide to help you select the hydraulic oils for top performance

Selecting the proper hydraulic fluid for your equipment can be one of your most important decisions. And it can pay off in many ways. Less down-time. Longer equipment life. Lower cost per unit.

Here are six bench marks to help you pick the best hydraulic oil for your plant requirements.

1. Does it have good oxidation stability? Oxidized hydraulic oil can form gums, lacquers and other deposits which may foul moving parts. Shell Tellus Oils are carefully refined to remove unstable, sludge-forming components—then fortified with a Shell-developed oxidation inhibitor.

2. Will it resist foaming and emulsification? Pump chatter and erratic operation are often the result of pump cavitation, brought on by oil foaming. Tellus® Oils contain additives to help prevent foaming.

3. Does it fight rust and corrosion? It is difficult to exclude all moisture from a hydraulic system. And moisture can form troublesome rust. Shell Tellus Oils have been carefully compounded to resist corrosion.

4. What are its lubrication qualities in continuous service? Shell Tellus Oils form a clinging, oily film on mating metal surfaces. This maintains a constant guard against wear.

5. How does it react to temperature changes? This is a key factor in the performance of hydraulic equipment. Careful selection of the proper viscosity grade of Tellus assures satisfactory operation of your system over its entire temperature range.

6. Is it available in several viscosity grades? Shell Tellus Oils are available in a broad range of viscosity grades. There's a special grade for virtually every hydraulic requirement.

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Ford Buys Two Autolite Plants

Ford Motor Co. has bought two Electric Autolite Co. plants.

The $28 million deal includes battery and sparkplug plants and patent-license rights.
By A. E. Fleming

■ Ford Motor Co. last week paid $28 million for two Electric Autolite Co. plants, use of Autolite's trade name, and various other assets.

The deal included a battery plant in Owosso, Mich., employing 350, and a sparkplug plant in Fostoria, O., employing 800. Production will continue at both plants.

License Rights—The agreement also included certain patents and license rights, and rights to the Autolite trade name in all countries except Canada, Brazil and Venezuela. Electric Autolite will continue to use the trade name in these countries. Autolite will also use it in its sparkplug and battery business with equipment manufacturers.

Ford will buy a large volume of automotive parts from Electric Autolite. In addition to sparkplugs and batteries, Autolite makes other electrical products, wire and die-castings for cars.

Uncertain Effects — How this action will affect Ford's current electrical equipment suppliers cannot be determined right now.

Champion Spark Plug Co. has been Ford's sole sparkplug supplier. Batteries have been made by several suppliers to specifications under Ford's name. Ford's hardwares and accessories division has made such components as lamps, generators, ignitions, coils, and distributor arms.

Sales Support—According to R. H. Davis, Autolite president, the company, headquartered in Toledo, will make its sales force available to Ford for the sale of sparkplugs, batteries and electrical products bearing the Autolite name.

Autolite still will make batteries and sparkplugs at other plants.

A year ago, Autolite indicated it was going to make substantial operational changes as its contract with Chrysler Corp. would end with 1961 model production. At that time, Chrysler started its own electrical equipment plant in Indianapolis.

Chrysler Loss—"Although most divisions of the company will do well," Mr. Davis said, "loss of most of the Chrysler electrical parts business will affect volume and earnings."

11 Pct Dropoff — Volume lost through Chrysler's departure, mostly in Toledo, amounts to around 11 pct of Electric Autolite's annual sales, which were $203 million in 1959.

While acquiring the Autolite plants, Ford sold its 650,000 sq ft Chester, Pa., car assembly plant for $2.2 million. The plant, which ceased operations March 15, was bought by Reynolds Metals Co. It will make insulated wire products.

Ford Gets New President

John Dykstra, vice president in charge of manufacturing, has been named president of Ford Motor Co. He is a specialist on quality control and production problems.

Along with Mr. Dykstra's appointment, Henry Ford II announced two other promotions: James O. Wright, vice president of the Car and Truck Group, was named to the board of directors and Robert J. Hampson, general manager of Tractor Operations, was elected a vice president.

Mr. Dykstra is the sixth president of Ford since the company was founded in 1903, and the third in the past year. (Robert S. McNamara left the auto company a few months after being named president to become U. S. Secretary of Defense. Mr. Ford became president as well as chairman of the board.) He had been vice president in charge of manufacturing since April, 1958.

Prior to that he had been in charge of manufacturing research, manufacturing engineering, plant engineering, quality control, and production programming and control. He joined Ford in 1947.



How's this for high-speed hobbing?

WORK PIECE					HOB (1 start)				Pieces per Load	Method*	Time per Piece	Pieces per Grind	Cut
Dia. Pitch	No. of Teeth	Helix Angle	Face Width	Material	Dia.	RPM	Feet PM	Feed					
10	20	15°	1¾"	1040 leaded	3"	500	395	.055"	1	A	2 min. 25 sec.	150	Finish
7	23	13°	¾"	8620	4"	350	370	.100"	2	A and B	59 sec.	240	Pre-shave
5	43	24°	1⅝"	8620	4"	280	300	.100"	2	B	3 min. 45 sec.	80	Pre-shave

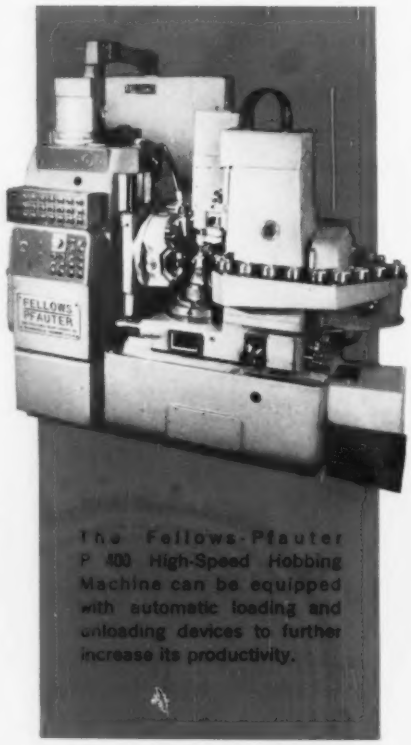
* *Method A: Diagonal Hobbing. Method B: Step-by-step Hobbing.*

The chart shows the cost-cutting, high-production performance you get with the Fellows-Pfauter P 400 High-Speed Hobbing Machine. And here are some advanced design features that make it possible:

It's Easy & Fast to Handle. Work area is easily accessible for setup and loading • Automatic retraction of table from hob facilitates work changes • Pushbutton hob shifting • Built-in hydraulics for operation of tailstock and fixtures • Provides infinitely variable speeds and feeds.

It's Rigid and Rugged for High Production. Heavy, rugged hob head • Double wall construction column and bed, with heavy V-ways • Table as large as maximum work piece diameter • Index worm gear nearly as large as work table • Work support column of massive construction.

Saves time, floor space and production costs. Get complete details on the Fellows-Pfauter P 400 High-Speed Hobbing Machine.



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Businessmen Forecast Pickup

Poll Shows Majority Expect Better Second Half

Hopes are high for improved second-half Farwest business.

This is the consensus of over 50 pct of 1000 businessmen polled by Prudential Insurance. Only 26 pct expect any dropoff. By R. R. Kay

■ Is the recession over in the Farwest?

The answer depends on whom you talk to. If he's a steelmaker, the reply goes something like this: "We're beginning to see some improvement in our order books — nothing to get excited about."

A machine toolmaker replies: "The past two months have been the best in two years."

Trend Shown — These answers show a trend. But they apply only to certain industries.

Now, along come forecasts of 1000 Farwest businessmen, polled by the Prudential Insurance Co. of America.

Over half expect their business during the second quarter this year will top the first. About 21 pct expect volume to be the same as the first quarter. Only 26 pct feel business will drop off in the second quarter.

Optimism is up a bit since the last survey three months ago. This follows a year and a half of business lag.

Best Regions—The most hopeful regions are southern California-Arizona-Nevada and Colorado-Wyoming-New Mexico.

Some 71 pct polled in these areas predict second quarter business will equal or top the same period last year. Washington-Oregon remains the least optimistic.

Duo Jetliner Looms

A cargo-passenger jetliner is about to be born. Douglas Aircraft Co. will show off its new entry in a first flight planned for August, 1962.

The company plans it as a version of the DC-8. Capacity will be 26 tons and 54 passengers. President Donald W. Douglas, Jr., says it will be the first jet specifically designed to combine freight and passenger loads.

Boeing Competes — Boeing, too, will soon announce a cargo-passenger version of its 707 jetliner.

Competition for business is bound to be fierce. There's only a handful of customers—the airlines.

Defense Hike Hailed

President Kennedy's recent reshuffling of military spending was good news for many West Coast aerospacemen.

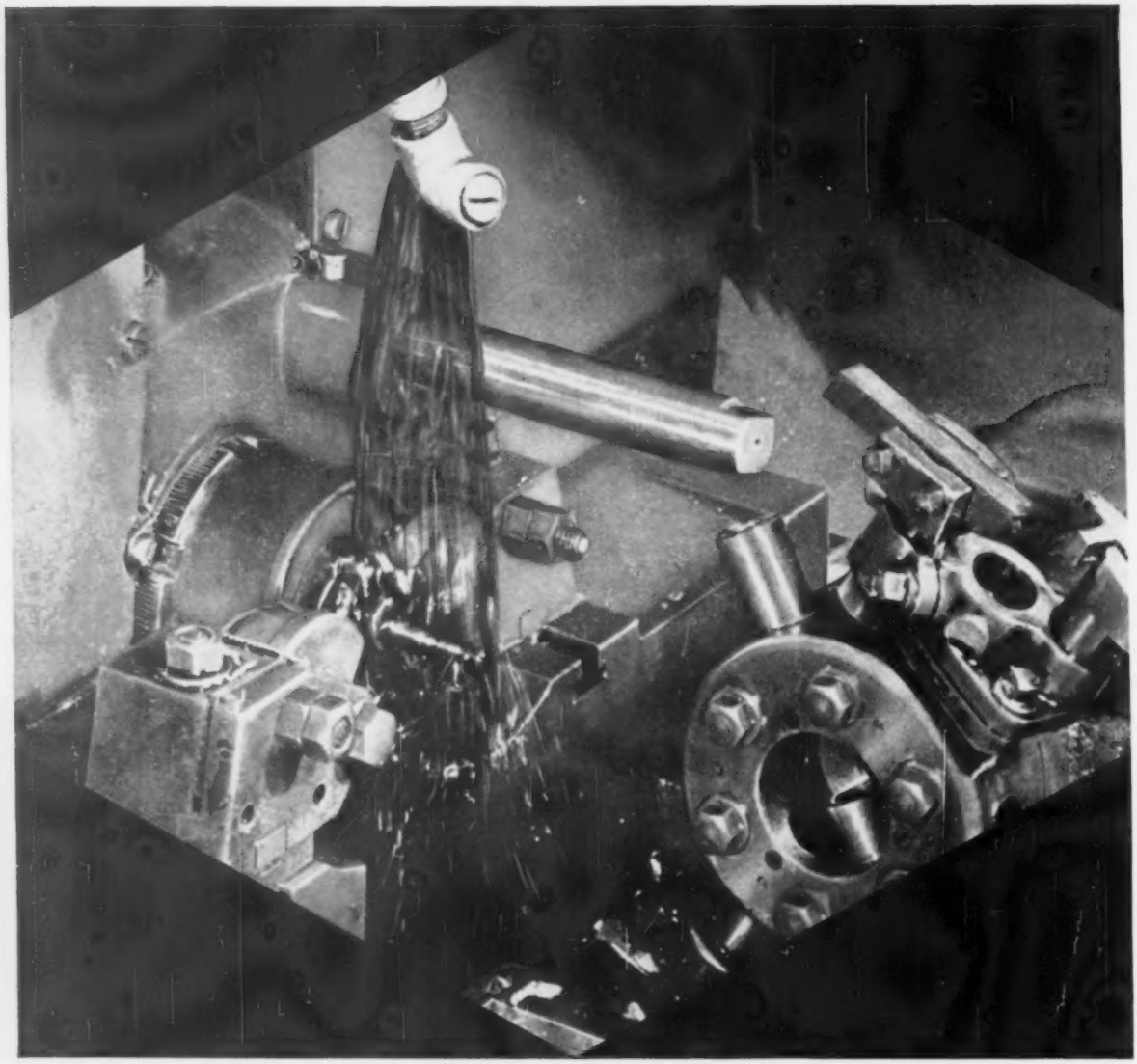
The President asked for an extra $2 billion. A big share of the new funds will find its way west.

If Congress approves, about $500 million will go to Lockheed for the Polaris missile. Boeing is in the budget request for $191 million for the Minuteman ICBM and other projects.

Outer Space Reactor Rates Closer Look



COMPACT PACKAGE: Reflector of 200-lb compact nuclear reactor for space is examined by a technician of Atomics International Div., North American Aviation, Inc. Reflector units surround the 9x13 in. core.



Replace those black, sulfurized oils! Get cooling, cutting properties you need in a transparent Sunicut cutting oil that lets operators *see* tools, workpieces, finishes and micrometer readings. Sunoco has a wide range of high quality, non-emulsifying Sunicut cutting oils for general-purpose or special-problem operations. They pump easily, wet metal fast, have high film strength, will not stain operators' hands or clothing.

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THE BEST ECONOMY OF ALL

You'll see significant savings, too, when you switch to a transparent Sunicut cutting oil. For you will get the exact *quality* you need for your operation . . . *job-fitted* by men who know what they are doing . . . teamed with *service* you never have to ask for twice.

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PIONEERING PETROLEUM PROGRESS FOR 75 YEARS

Is Tool Production Faltering?

Industry Spokesman Calls for Federal 'Encouragement'

Machine tool producers are turning out 90 pct fewer machines than in 1942. But today's tools are more productive.

Nevertheless, a NMTBA spokesman says the country should be generally alarmed over production problems.
By R. H. Eshelman

■ U. S. machine tool production has dropped more than 90 pct since 1942. This fact, according to Ludlow King, "should now be of general alarm to our entire country."

Mr. King, executive vice president, National Machine Tool Builders' Assn., made his comparison at the Silver Anniversary Machine Tool Forum in Pittsburgh recently.

He said: ". . . in 1960, we produced only 35,000 machine tools —less than one-tenth of the 1942 production and 16,500 units less than we produced in 1939."

Automation — Mr. King added, though: "More of today's machines are multi-purpose and provide more productivity than those built 25 years ago. It is generally estimated, however, that the new machines only add approximately three pct per year to the productivity of the workers."

The association leader said wage rates rise faster than the production increase "and there lies one of the great dangers facing our economy."

Presidential Encouragement— Nevertheless, Mr. King noted: "It is most encouraging to learn that the President is demonstrating an awareness of production problems now facing our country. He is bringing into national focus a truism which is generally forgotten except in times of emergencies. No nation can be stronger than its ability to produce."

Reference was made to Mr. Kennedy's speech before the National Industrial Conference Board in February. In that message the President said: "The average age of equipment in American factories today is about nine years. In a dynamic economy, the average should be falling, as new equipment is put into place. Instead, the available evidence suggests it has been slowly rising.

". . . We must start now to provide additional stimulus to the modernization of American industrial plants."

What's Needed? — What steps should be taken to encourage industry expansion?

NMTBA president, Everett M. Hicks, told the Forum "The Administration should adopt policies which will be helpful to our industries in reducing their costs. Our own machine tool industry, for example, is faced with a likelihood that a special minimum wage will be established for us under the Walsh-Healey Act.

"It is a little hard to understand why such action should be taken at a time when our industry is in a fight for survival. This sort of action can only discourage and create lack of confidence, the very thing we should be trying to avoid."

Mr. Hicks also noted: "The only sound growth is that brought about by expansion of private enterprise. While government spending can provide a temporary stimulant to the economy, this stimulant will stop as soon as the spending program is discontinued."



E. M. HICKS: "America will lose in the crucial contest and all mankind will be the loser, unless fortright, practical actions are taken to modernize our national industrial plant. Obsolescent machinery figures are alarming.

"In a very real sense the problems faced by the machine tool industry are the same as those faced by many other industries in this country.

"With most of our builders operating at a depressed level, all of us are concentrating on ways to reduce costs in our organizations. And after several years of poor business, I can assure you many of our organizations are very streamlined indeed.

". . . If we are going to retain our domestic customers and keep them wanting to buy machines from us, we must not neglect to pay full attention to their service needs."



A. B. Allison, named president, Howe Precision Products Co.

Standard Tool & Mfg. Co.—**L. K. Shepard,** named vice president, sales.

Reeves Soundcraft Corp.—**A. J. Seiler,** elected vice president and director.

Reynolds Metals Co.—**Dr. Irving Roberts,** elected a vice president.

Sidney Machine Tool Co.—**E. W. Wagner,** named vice president and general manager.

Toledo Scale Corp.—**R. E. Bell,** appointed vice president, engineering, Toledo Scale Div.; **R. O. Bradley,** appointed vice president, engineering, Haughton Elevator Div.

General Tire & Rubber Co.—**T. F. O'Neil,** elected chairman of the board.

Industry, Inc.—**E. J. Osterhus,** appointed executive vice president; **W. J. Hood,** appointed vice president, engineering.

Pittsburgh Plate Glass Co.—**J. E. Burrell,** appointed vice president, operations, Chemical Div.

Rockwell Mfg. Co.—**J. H. Diehl,** named asst. vice president, manufacturing, Power Tool Div.; **E. L. Tabat,** named vice president, marketing, Power Tool Div.

Republic Flow Meters Co.—**O. W. Riggs,** appointed manager, instrument and control product sales.

Toledo Steel Tube Co.—**H. W. McKisson, Jr.,** elected president; **V. O. Johnstone,** elected vice president and sales manager; **George McKisson,** elected vice president, manufacturing; **Frances Pilliod,** elected secretary-treasurer.

Tubular Rivet and Stud Co.—**C. E. Smith,** named vice president, production.

Thor Power Tool Co.—**M. E. Slater,** appointed executive assistant to the president.

Taylor Fibre Co.—**S. S. Anders,** elected treasurer.



Arthur Sternberg, appointed vice president and general manager, Electrical Div., Fairbanks, Morse & Co.

Leeds & Northrup Co.—**D. H. Schultz,** elected president, Leeds & Northrup, Canada, Ltd.

Black and Decker Mfg. Co.—**E. E. Randle,** named district sales manager, Los Angeles, Industrial-Automotive Div.

General Electric Co.—**J. D. Webster,** named manager, industrial marketing, X-Ray Dept.

Garlock Inc.—**C. E. Bellew,** appointed manager, manufacturing division.

Luria Bros. & Co., Inc.—**Richard Follansbee,** named manager, industrial sales, Non Ferrous Div.

(Continued on P. 124)



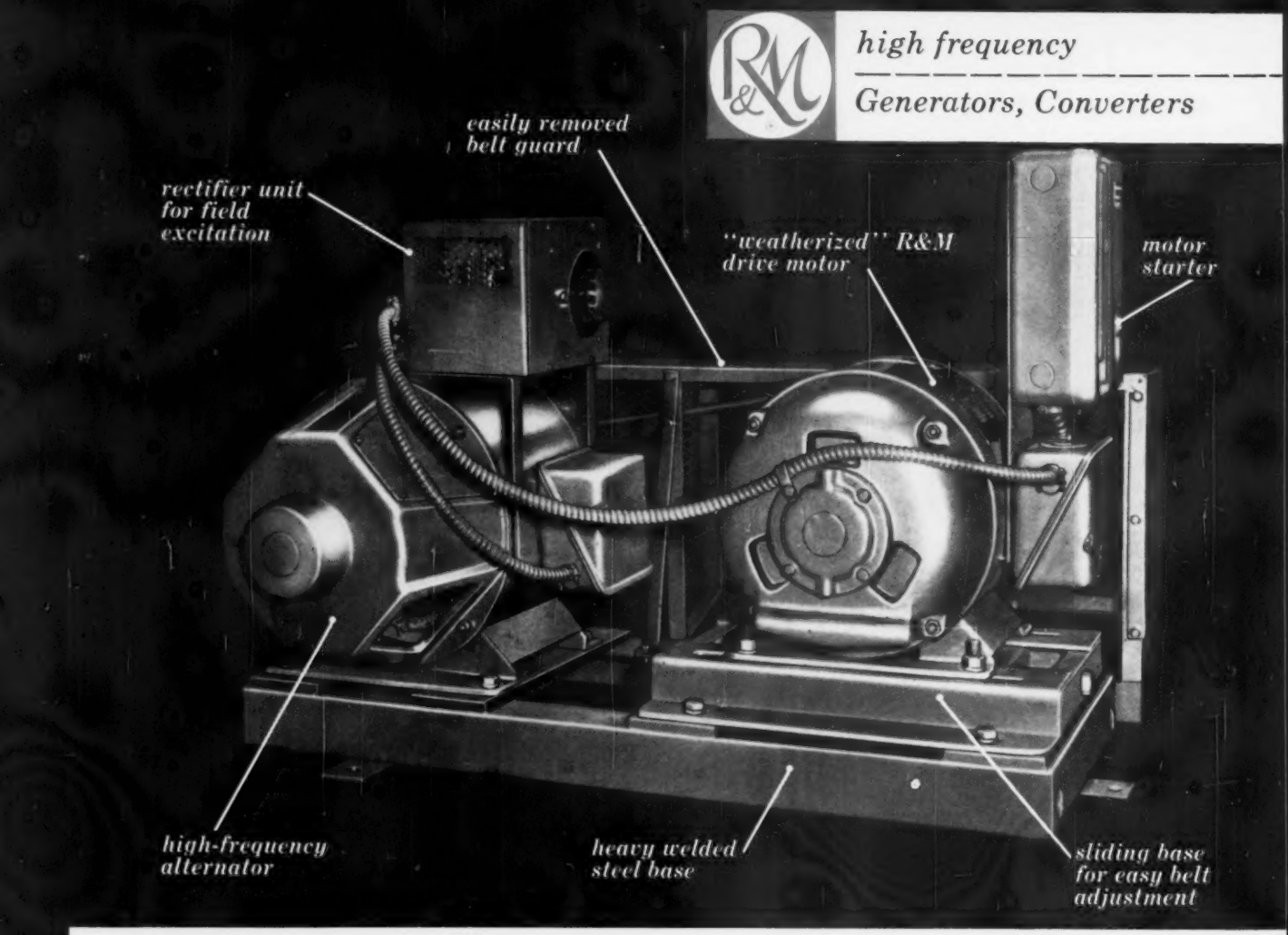
C. G. Bigelow, Jr., elected vice president, research, Selas Corp. of America.



P. C. Ely, appointed general manager, operations, National Tube Div., United States Steel Corp.



W. P. Rhodes, appointed general manager, marketing, National Tube Div., United States Steel Corp.





Compact High Frequency Power Generators

360 to 3300 cycles

R&M package high cycle generators provide dependable current beyond the practical range of frequency converters. Rugged revolving field construction is used in ratings of 1500 cycles and lower. Ratings above 1500 cycles are brushless inductor design. Excitation of DC alternator field is provided by simple silicon rectifiers, protected against short circuits by time-delay fuses. For changing output frequency, R&M can furnish variable pitch pulleys or variable speed drives. R&M's low-cost frequency converters make 220 volt-3 phase-120 through 420 cycle power available from 60 cycle supply . . . rated 2½KW (horizontal construction) 5, 7½ and 10KW (vertical).

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Fractional and Integral HP Electric Motors • Electric Hoists and Overhead Traveling Cranes • Moyno® Industrial Pumps
Propellair® Industrial Fans • R & M-Hunter Fans and Electric Heat • Trade-Wind Range Hoods and Ventilators
Subsidiary companies at: Memphis, Tenn., Pico Rivera, Calif., Brantford, Ontario.

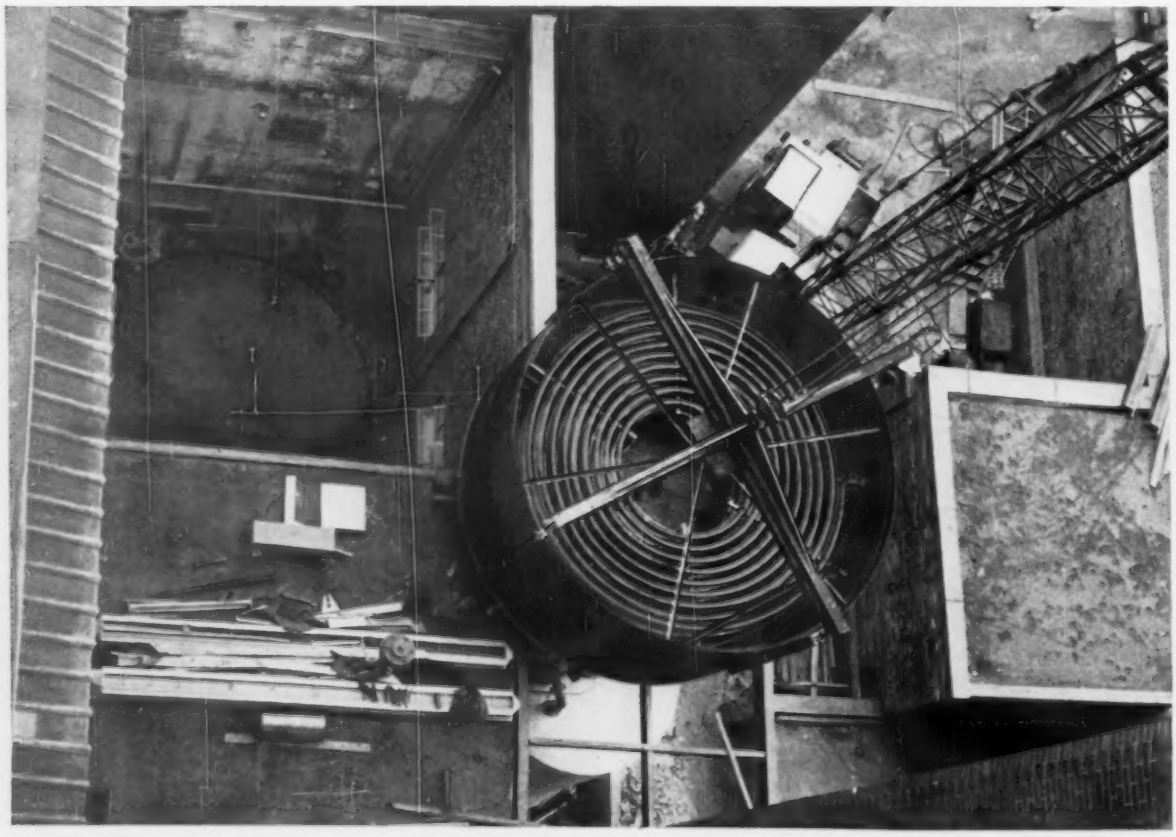
Seagram's "to be sure" for its new

REVERE COPPER
Plate and Tube fabricated by
Matt Corcoran & Company
into whiskey refinement
distillation unit for
Joseph E. Seagram & Sons, Inc.

On these pages, you see what is known in distilling as a "doubler". Doubling is further distillation of beverage spirits in a "doubler" or copper kettle to acquire an additional degree of refinement. Coupled with a larger capacity, this doubler offers a distinct advantage—a larger distillation cycle resulting in a greater uniformity of product. These are some of the reasons for the consistently fine quality of Seagram products.

This doubler was fabricated in three sections which were transported on flat-bed trucks from the copper-smithing plant of Matt Corcoran & Company, Industrial Boulevard in Louisville, Kentucky to the port of shipping at Aurora, Ind. From there, they were trucked to the Joseph E. Seagram & Sons, Inc. Distillery at Lawrenceburg, Indiana.

In order to install the doubler it was necessary to remove the roof from a distillery building. Once in the building, the



used REVERE COPPER "Doubler"...

three sections were welded together, and the roof was replaced.

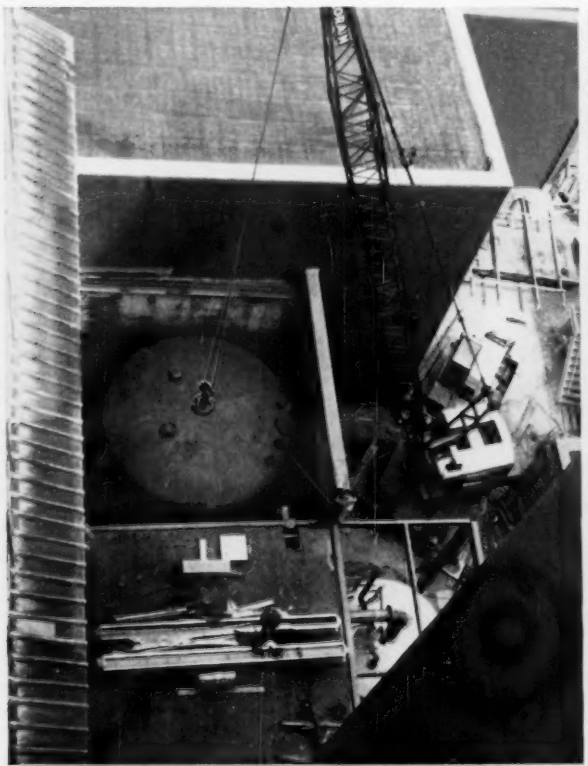
Revere Copper was selected for the doubler because the inherent characteristics of man's oldest metal have proved superior in distilling fine whiskey. It does not react with alcohol and a wide variety of other liquids and gases.

And, as to the advantages of working with copper, Matt Corcoran & Company, who has been working with this metal for over a half century has this to say, "Copper is extremely easy to work into any desired shape or design, it conducts heat quicker and with greater uniformity than any other commercial metal, and is quickly and economically welded by modern methods. This latter characteristic of copper was particularly important in the Seagram installation. In this case the three-section doubler had to be welded together under conditions where there was barely room for a man to get between the sides of the vessel and the walls of the building in which it was installed."

And, it was because of these same superior characteristics that copper was used in the interior of the doubler in the form of Revere Copper Tube . . . 1,000′ of 4″ O.D.

It is jobs such as this doubler that have given Revere the background of experience that can prove valuable in the solution of your particular metals problem . . . whether it involves copper, brass, aluminum, or any one of their alloys.

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COPPER AND BRASS INCORPORATED
Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.
Sales Offices in Principal Cities. Mills: Rome, N. Y.; Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford and Plymouth, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb.
Distributors Everywhere.





(left)—**LOWERING BOTTOM SECTION** of the doubler into position. *(above)*—**TOP SECTION OF DOUBLER** is fitted into place. You can readily see why it was necessary to remove roof prior to installation. *(above right)*—**TOP SECTION OF DOUBLER** being removed from flat-bed truck and placed aboard barge preparatory to trip to Aurora, Indiana, from where the three sections were trucked to the Joseph E. Seagram & Sons, Inc., Distillery at Lawrenceburg, Indiana.

(Continued from P. 120)



C. A. Koerner, appointed divisional works manager, Central Foundry Div., General Motors Corp.

Pittsburgh Commercial Heat Treating Co.—**E. J. Cox,** named president.

Yuba Consolidated Industries, Inc.—**J. P. Murphy,** elected president.

Pacific Scientific Co.—**R. V. Eldridge,** elected secretary and treasurer.

Armco Steel Corp.—**H. W. Wright,** appointed asst. vice president, corporate relations; **William Verity,** named director, public relations; **J. F. Mohan,** appointed asst. vice president, personnel and public relations; **J. G. Purvis,** named manager, personnel, Armco Div., **J. S. Chapman,** manager, safety.

Springfield Foundry Co.—**A. C. Andrew,** appointed superintendent, Gray Iron operations.

Colorado Fuel and Iron Corp.—**H. B. Smith,** appointed asst. sales manager, realock fence dept.

Macwhyte Wire Rope Co.—**W. J. Anderson,** appointed district sales manager, Chicago.

Sylvania Electric Products Inc.—**E. E. Broker,** appointed general mfg. manager, parts div.; **George Konkol,** appointed general manager, microwave device operations.

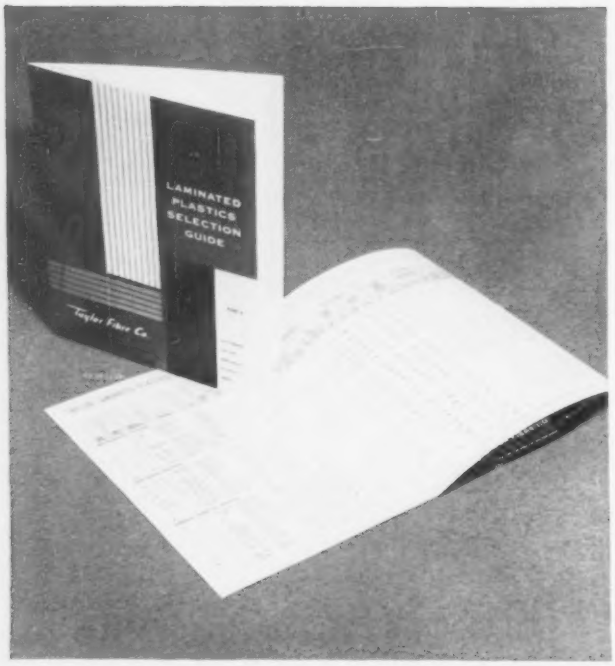
A. P. Green Fire Brick Co.—**F. M. Maupin,** appointed director, engineering.

Atlas Mineral Products Co., Inc.—**T. B. Cardene,** appointed technical sales representative, Richmond, Va.; **Dallas Cann,** appointed technical sales representative, Milwaukee.



C. E. Drury, named divisional director, sales and engineering, Central Foundry Div., General Motors Corp.

Specifying LAMINATED PLASTICS...as sheet,



Use this Taylor Selection Guide to make selections of the Taylor laminated plastics that will fit your requirements.

TAYLOR FIBRE CO. BELONGS IN YOUR SPECIFICATIONS

Taylor has the products... offers more than 50 grades of industrial laminated plastics . . . including paper, cotton cloth, nylon, asbestos, glass cloth, or other base material impregnated with phenolic, melamine, silicone or epoxy resins and formed into sheets, rods and tubes under heat and pressure. Also a number of composite materials, including copper-clad laminated plastics, vulcanized fibre and laminated plastics, rubber and laminated plastics, asbestos and laminated plastics, and aluminum and laminated plastics.

Westinghouse Electric Corp.—**G. R. Dunbar,** named manager, aviation industry sales.

American Bosch Arma Corp.—**John Cammarata,** named manager, product reliability, Arma Div.

Budd Co.—**R. W. Oliver,** appointed controller, research service.



Franklin Meyer, Jr., appointed vice president, engineering, Taft-Peirce Mfg. Co.

General Electric Co.—**P. C. Van Dyck,** named general manager, Service Shops Dept.; **N. E. Firestone,** appointed general manager, Flight Propulsion Div.



K. H. Williamson, appointed vice president, manufacturing, Taft-Peirce Mfg. Co.

Hyster Co. — **W. H. Peterson,** named manager, training and planning; **C. A. Richmond,** appointed personnel manager, general office group.



J. G. Zeiger, appointed vice president, marketing, Taft-Peirce Mfg. Co.

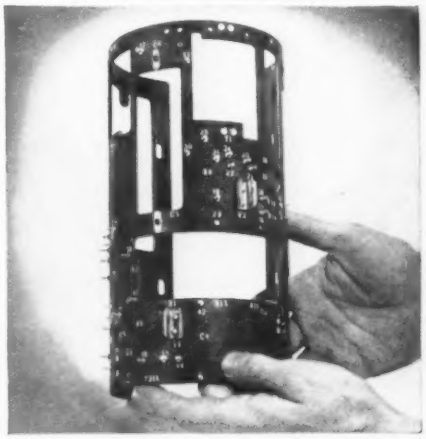
OBITUARY

Ernest E. Thum, 76, director of editorial services, American Society for Metals, died April 10. He had been an associate editor of The IRON AGE prior to joining the Society staff in 1930, later rose to be editor and then editor-in-chief of "Metal Progress."

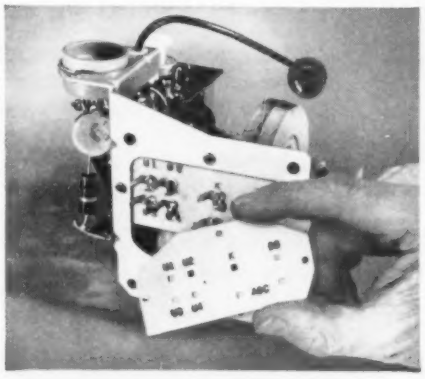
rod, tube or fabricated parts?

Taylor has the facilities. Its Norristown, Pa., plant, comprising some 300,000 sq. ft., produces both laminated plastics and vulcanized fibre . . . is one of the most completely integrated in the industry . . . even makes its own paper and a large percentage of its own resins. The La Verne, Calif., plant, with over 45,000 sq. ft. of floor space, specializes in the manufacture of laminated plastics for the convenience of West Coast customers. And both plants can fabricate parts from any Taylor materials to specifications, economically.

Taylor laminates offer many advantages over metals. They have a higher strength-to-weight ratio, are corrosion resistant, and can be fabricated more easily. This Taylor Selection Guide will help you evaluate the different grades available. Write for your copy today. Taylor Fibre Co., Norristown 52, Pa.



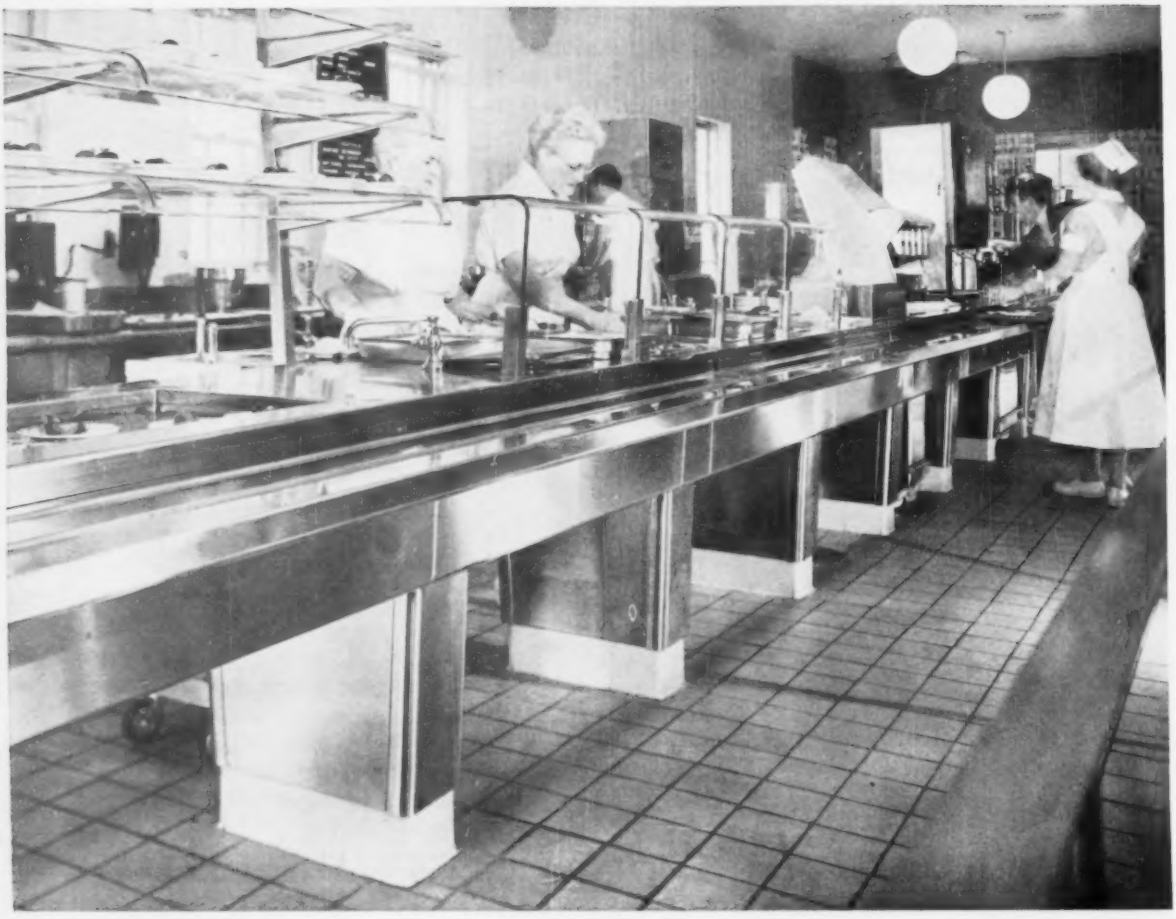
For applications requiring high strength retention at elevated temperatures, Taylor Grade GEC—an epoxy resin, glass fabric base material.



For high-temperature electrical applications and high-frequency radio equipment, Taylor Grade GSC—a silicone resin, glass fabric base material. Has high heat resistance, excellent electrical properties, and high arc resistance. Will not support combustion.

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A New York hospital
Equipment by
S. BLICKMAN, INC.
Weehawken, N. J.

go first class

go stainless

There are two requirements for a top-notch food preparation area: (1) Equipment of good design that eliminates places for bacteria to collect; and (2) Equipment made of lifetime stainless steel–the smoothest, easiest to clean and most bacteria and vermin resisting material you can buy. *It's a better product if it's made of stainless!*

WASHINGTON STEEL CORPORATION
and ColorRold®
PRODUCERS OF *MicroRold®* STAINLESS SHEET & STRIP
WASHINGTON, PA.

Stainless Steel

Missing: Solid-Fuel Funds

Solid fuels for space vehicles are getting lots of attention—but little funds—in Washington. The NASA is studying possible uses of solid propellents; but this space agency can do little more than study. Recently, the Budget Bureau turned down NASA's request for a $5-million increase in funds for solid-fuel research. This didn't please some congressmen.

Locates Lost Airmen

North American Aviation's pilots and crewmen pack palm-sized radio transmitters in their parachutes. As soon as each chute opens, the radio starts sending signals. This beacon, with a range of 70 miles, pinpoints bale-out locations. Tuned to 243 megacycles, the transmitter operates about 4 hours on mercury batteries.

Alloys for Outer Space

The Administration plans to step up research projects on the use of manganese-copper alloys as space metals. The U. S. Bureau of Mines says: "The high vibration-dampening qualities of manganese-copper alloys, combined with good physical properties, make them of considerable interest for military and space-age applications." Funds for advanced research were requested in the Bureau's budget for fiscal 1962.

"Equal Time" in Space

Frequency sharing is a future must for space systems, so say experts from the electronic industries. If the military and A. T. & T. systems get all the frequencies they want, the total assignments would exceed 35,000 megacycles by the turn of the century. This would be three and a half times the number of channels best suited for space and surface service.

Who's Ahead in Research?

A Ford Motor Co. scientist says the U. S. leads the Soviet Union in basic scientific research. However, improvement is needed in military research programs, if we're to maintain this lead. Dr. J. E. Goldman, associate director of Ford's Scientific Lab, reports: "There is indeed a science gap between the Soviet Union and the U. S. But this gap appears to be in our favor." Dr. Goldman emphasizes the breadth and depth of America's basic industrial-research labs.

Forge to Tight Tolerances

Aerospace requirements place severe demands on forge-to-shape parts. To meet these ever-changing needs, new alloys are being developed. One class of new materials is the forgeable superalloys. Impression-die forging of most of these superalloys has been restricted to disk shapes. Recently, however, complex airframe parts have been forged to extremely tight tolerances.

Shooting for the Moon

Development of a U. S. nuclear space rocket is moving ahead. Seven companies have submitted their proposals for a nuclear engine to power rockets aimed at the moon. Adaption of these diversified plans may help the Administration to reduce Russia's lead in space.

Prevent Flight Ice-ups

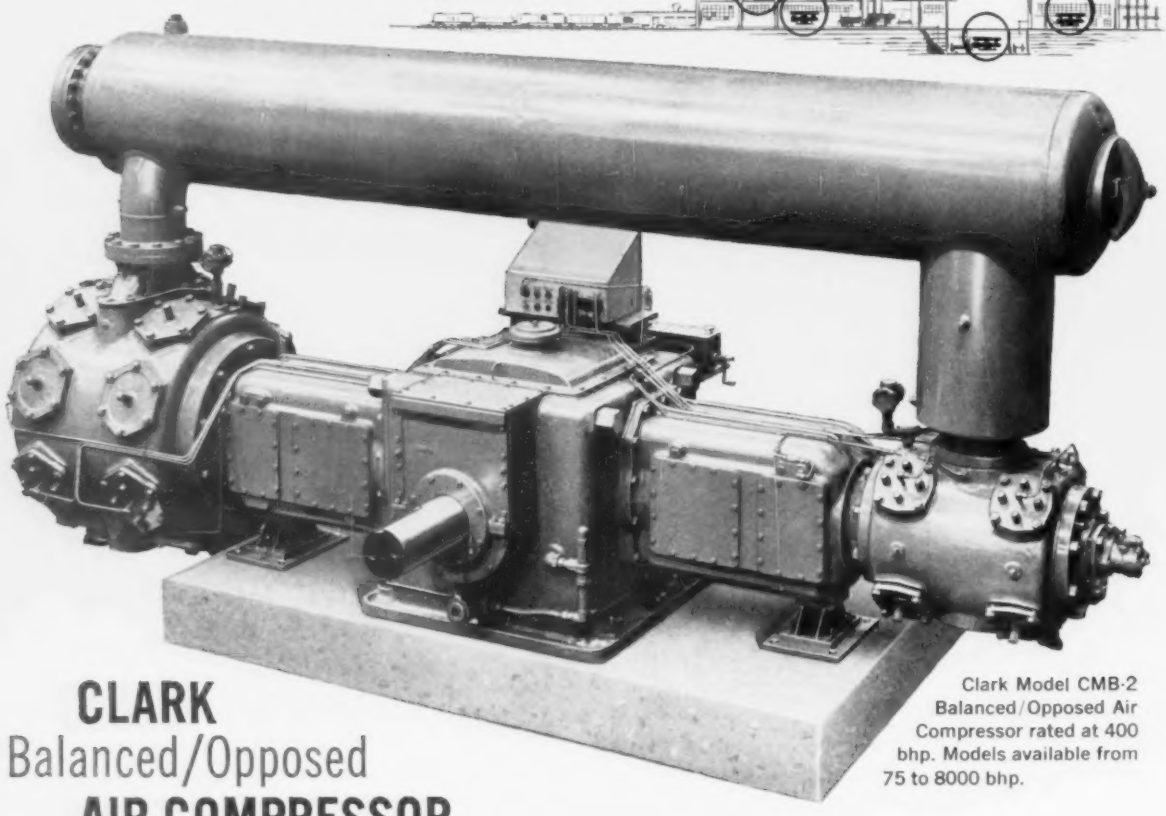
With 48 wires per inch, spaced 0.006 in. apart, a knitted-wire heating element removes ice from wings, propellers and other airplane surfaces. Each wire is 0.015 in. in diameter. The mat-like assembly is knitted in a "wiggly pattern" to allow for thermal expansion and flexibility. Rubber impregnators eliminate shorting and cold spots. These ice guards are being used on the Boeing 707 and on several helicopter models.

Extends Metal Research

A device that can subject alloys for use in airframes to 100,000-atmospheres pressure at heats up to 1500°C has been designed and built for the Air Force. With this apparatus, high hydrostatic pressures lower the temperature of martensitic transformations in iron-nickel alloys. These pressures also expand the temperature loop in the iron-chromium system. Precipitation hardening in both aluminum-copper and copper-beryllium alloys is also being checked.

Conspicuous by its Performance

...no matter **WHERE** *you put it!*



Clark Model CMB-2 Balanced/Opposed Air Compressor rated at 400 bhp. Models available from 75 to 8000 bhp.

CLARK
Balanced/Opposed
AIR COMPRESSOR

Air Power—100 lb. Variety—The kind that is economical, dependable . . . That's what you get with a compact Clark Balanced/Opposed Air compressor. You may hide it in the basement or the boiler room, but this smooth running veteran will always be conspicuous by its performance.

Efficiency at All Key Points—Compressor cylinders utilize large, streamlined air passages and optimum number of valves to minimize pressure drop, turbulence and valve losses. The heavy duty *Simplaire* valve has only one moving part on the low pressure suction side. Its webbed disc valve ring is opposed by minimum spring force, operates with less total differential pressure than any other compressor valve design. The Clark intercooler is carefully engineered for highest possible heat transfer rates. Double wall construction provides a large surge chamber to minimize pressure drop and assure maximum delivery of air.

A Real Space Saver—Squeeze it into "impossible" places . . . install large amounts of horsepower in limited areas. Compact Clark design with overhung integrally supported rotor makes the most of available space, eliminates bulky extension shafts with outboard bearings and flywheel.

Perfect Running Balance—Clark Balanced/Opposed design cancels out primary and secondary unbalanced forces. Units run smooth and quiet, thereby easing wear on moving parts. Foundations need only be large enough to support the physical weight of the compressor. You can locate a Clark machine anywhere . . . with confidence.

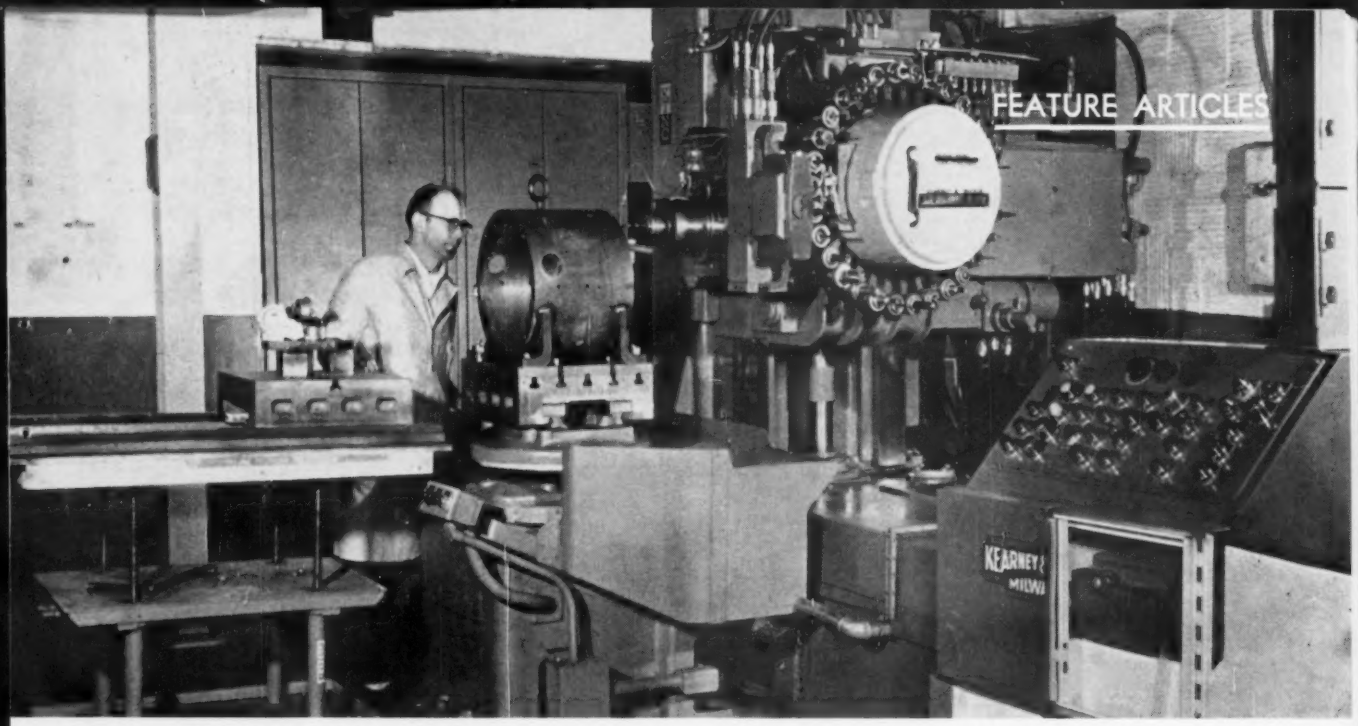
Low, Low Maintenance—Internal components are easy to get at, easy to service. Clark *Simplaire* valves are ultra simple in design, can be readily installed, or disassembled and cleaned. Valve bodies and housings of like size are completely interchangeable for suction or discharge, offer no alignment problems.

Put Greater Efficiency into every compressor dollar you spend. Contact your nearest Clark representative for full details, or write for Bulletin 185.

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OIL • GAS • CHEMICAL
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NUMERICAL CONTROL: Tape-controlled setups are taking over more and more metalworking functions.

Progressive Automation: A Way To Fight Foreign Competition

By **G. W. Jernstedt**—Mgr., Mfg. Planning, Westinghouse Electric Corp., Pittsburgh

Increased costs and foreign inroads can be countered with new methods and new equipment.

But you've got to plan for the future right now. Are you ready to tackle tomorrow's manufacturing problems?

■ In 1965, a successful metalworking plant will use 25-50 pct new methods and new equipment. These methods and tools are not presently in production.

Everyone should reflect on this situation. Consider it in the light of your current production needs.

To obtain economically-desirable and production-proven techniques four or five years from now, you've got to begin developing them right now. Don't waste another day. Remember, it takes time to weed the bad ideas from the good.

Advance Planning—In order to remain in business in the years to come, what changes should a company make at the present time? To find the answer, let's examine one of the basic requirements of manufacturing. This basic need revolves around increasing productivity.

Does productivity have to increase every year? And, if it must, then how big should this yearly increase be?

Costs rise every year. These inflationary costs are much higher than most executives realize. An example centers on rising wages.

During the period 1940-59, the cost of an hour's work for a steelworker rose from 94¢ to $4.00. This equals an increase of about 8 pct a year, compounded.

Foreign Competition — It's obvious that steel mills must continually step up their productivity to make up for these higher costs. The problem becomes more complex as a result of foreign competition. This competition poses a threat to most American metalworkers.

Let's find out why. Are products made outside this country, in general, better than those made at home? Obviously, the answer is no. Do foreign companies have better

plants and facilities. Again, the answer is no.

Do these foreign competitors have better workers than America's labor force? Once again, the answer is no. Then, what do they have?

Dual Factors — Foreign plants have two major advantages: Labor costs are low; and both management and workers are enthusiastic.

In Europe, wages range from one-third to one-fourth the rates paid in this country. In the Far East, worker costs are on the order of one-tenth the wages that U. S. employees receive.

Now, we'll gage enthusiasm. European and Asian manufacturers push team spirit. This gives workers a sense of common interests and group responsibility. No problem is too tough to tackle.

Everyone is willing to try new methods—even if they have to copy them from someone else. Americans would do well to pick up more enthusiasm. It would be useful in tackling some of the tough problems that face U. S. manufacturers.

Higher and Higher — A simple chart shows how much output is gained from a worker's efforts. When he's first put on a job, a new worker doesn't produce as much as a trained operator. However, he soon reaches a plateau above which it's hard to rise.

Another chart compares last year's labor and equipment costs with those of 1900. Note what has happened to worker costs. This trend is likely to continue.

If American manufacturers expect to be competitive in the years ahead, they must focus more attention on improving methods and equipment. Progressive automation offers the only solution to spiralling costs.

Most people can't afford to spend large amounts of money unless they have a plan in mind. By the same token, you can't buy automation at a piece-at-a-time rates and hope it will fit into next year's program.

Whenever you buy a piece of equipment, you should ask yourself: How will it fit into the next step? The only way to do this is to set up a planning organization.

Team Action—Automation cuts across functions. It's big enough that it requires team action. With proper planning and group effort, you may avoid buying a costly piece of equipment—which in a year or two wouldn't fit your company's needs.

Unneeded equipment clutters up a shop. It occupies floor space and holds up the purchase of improved equipment. To solve this problem, plan a sound equipment-retirement and replacement policy.

Westinghouse's replacement code states: "Replace facilities when an overall savings of 20 pct or more will result from the added investment."

Very often, relatively new equipment should be replaced. One machine-tool builder had two large radial drills installed less than two years ago. When tape-controlled radial drills were put on the market, he decided to replace these nearly-new machine tools.

He made these replacements for just one reason. He wants to keep his profits high.

Proceed With Caution—It might be well to discuss some of the pitfalls of automation. At best, automation combines simple, production-proven operations. If a job can be done with manual methods, chances are it can be done automatically.

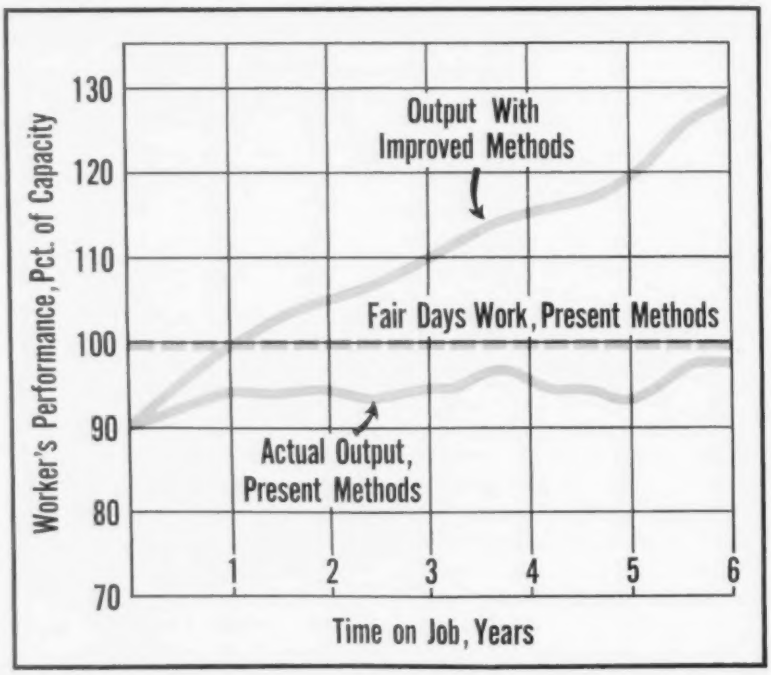
Generally, it's cheaper to do a job automatically, after you've developed the best manual techniques.

In considering automation, many people make the same common mistake. They only look at high-volume activities. Actually, it appears that medium- and low-activity items, such as job-shop products, offer the greatest benefits from automation.

For example, tape-controlled setups can process short runs at real savings. These savings include reductions in direct-labor, tooling and setup costs.

Modular Systems—Here's a word of caution. Some people take too large a first step. Thus, they com-

Automation Boosts Efficiency



pound the possibility of error.

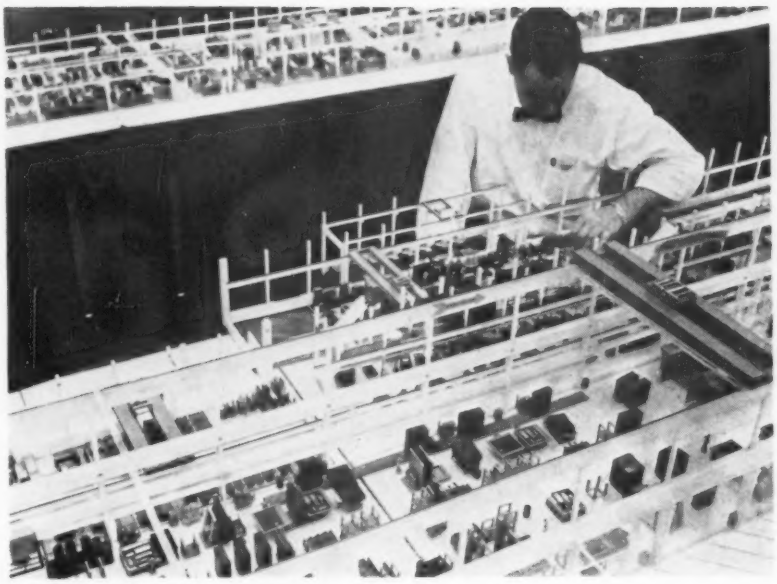
One big machine often costs more than two or three small machines. But some smaller units can be easily combined to form a single highly-efficient system.

To obtain continually-higher productivity, you've got to improve manufacturing flow. As work flow improves, productivity goes up.

Numerical- and tape - controlled setups are expanding at a rapid rate. Every manufacturer should educate himself in regard to where this type of processing can speed up his current and future operations.

Plan With Model—Let's check a few of the items that will assist a manufacturer in this effort. Small fixtures give machine operators invaluable aid. But, it's easy to overlook large three-dimensional layouts.

Such layouts can improve manufacturing operations. They permit all departments and functions of a plant to get into the act. It's a lot easier and less expensive to uncover mistakes in models then it is after actual construction is completed.



MODEL LAYOUT: Three-dimensional layouts help you to see how a new piece of equipment will affect your current manufacturing flow.

Three-dimensional layouts show exactly how a manufacturing flow can be arranged to suit various needs. They let you see how the addition of a piece of equipment affects an existing line—before you actually buy the new machine.

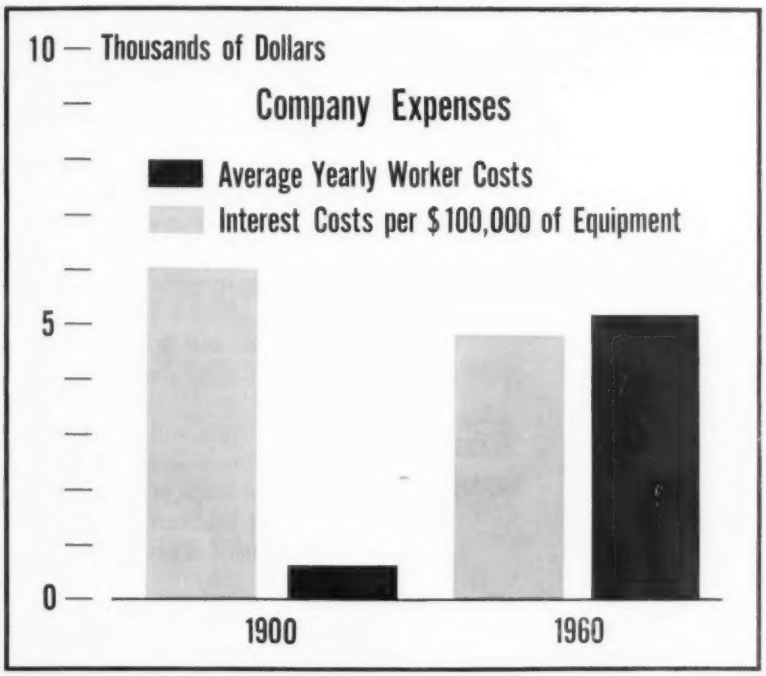
Probe New Methods—Everyone in the manufacturing business today should be probing for methods to establish a cost breakthrough. Explosive forming offers such a breakthrough for some forging jobs.

Using explosives, it's possible to trim and shape a part to size with a single blast. Explosives can also blast away assembly costs. Shaped charges form complex parts that otherwise would have to be made in sections.

Plasma-Jet Flame — Metals and alloys that can't be cut by conventional methods are becoming familiar problems. High heat may be the answer. A new plasma gun operates at 25,000°F, yet the operator can hold this gun in his hand.

Another unusual process which has found its place on the production line is electron-beam welding. The precision of this process and the very narrow heat-affected zones provide an optimum joining method.

Worker Costs Spiral Skyward



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Plastic Chain Makes Its Bid

Glass-Fiber Reinforced Plastics Built in Round Links

Did you know that some buoys in the North Sea are anchored by reinforced plastic chain?

This new development also shows promise for many low-temperature applications.

▪ The conventional round-link chain is a common sight in any metalworking plant. It handles many jobs well, but there is still room for improvement.

In some cases, it would help if the chain were lighter or more rust-proof. Another material might be put to better advantage if it would hold up at lower temperatures. Chains that are anti-magnetic, non-sparking or good insulators could be more useful, too.

All these points combined to prompt two German engineers to look into glass-fiber reinforced plastics as a possible material for chains. As reported at the recent annual meeting of the Society of the Plastics Industry in Chicago, such chains are a promising reality.

Seaworthy—According to P. Koch, director of Kettenwerke Schlieper GmbH., and W. Gerhardt, director of Dortmund-Hörder Hüttenunion, plastic chains have already been tested successfully in the field. Buoys in the Baltic and North Seas have been anchored for almost two years with chain made from reinforced plastics.

These round-link chains are made by winding impregnated glass filament in plastic shells. Special machines do the actual winding. This process permits the production of many sizes. In the past, the biggest demand was for chains in the 10- to 16-mm diam range.

Many variations are possible, too. All that is needed is to change the composition of the resin or to use different materials for the shells. As a result, chains can be made for a number of stresses. By adding colorants and luminous substances to the shell material, the chain can even be used for marking and recognition purposes.

Spun Into Shells—After the glass filaments have been impregnated in liquid resin, they are spun into the plastic shells. The endless filament is then wound in layers under a certain amount of tension. In this manner, the load is carried evenly by the full cross-section.

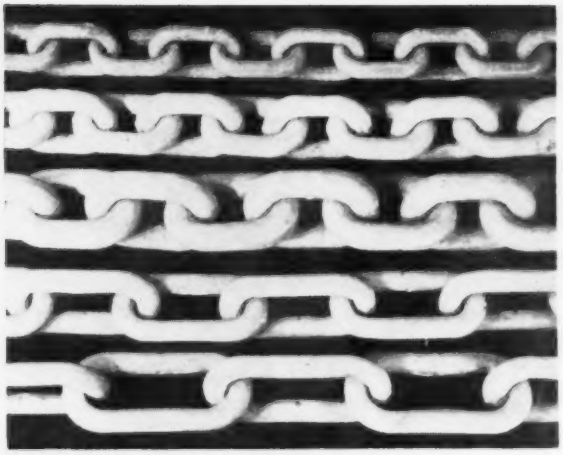
According to the German developers, standard steel chains have a proof stress of 6 to 8 kg per sq mm. For safety reasons, the first plastic chains were given proof stresses of about 4 kg per sq mm. Also, the ultimate breaking stresses were specified at about 20 kg per sq mm.

A steel chain will start to yield under load much sooner than a steel rod. But the shape of the chain link reduces the load-carrying capacity. Plastic chains don't behave this way at all.

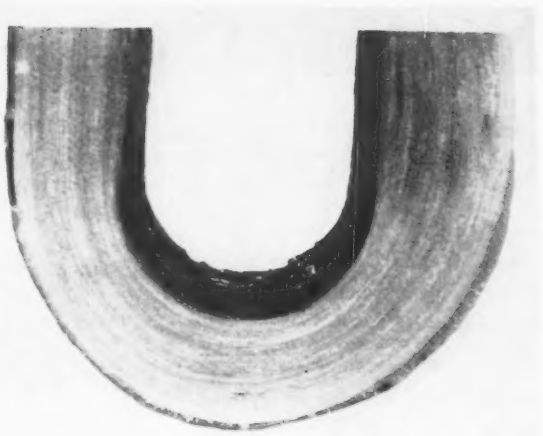
Elastic Traits—A plastic chain, until just prior to fracture, only dis-



HOISTING PROPERTIES: Glass-fiber reinforced plastic chain can lift limited loads to date, but it's strong enough to hoist small cars.



IN MANY SIZES: The biggest demand for chain is in the 10-16 mm diam range. Chain composition can be varied to suit the desired end use.



LONGITUDINAL VIEW: To make the chain, glass filaments are spun into plastic shells. The shell can be varied, too, giving wider scope.

plays elastic deformation. The gageable elongation, however, is up to about 15 pct.

Before plastic chains can be worked through toothed pulleys, different design principles must be employed.

Reinforced plastic chains hold up extremely well at lower temperatures. By virtue of the laminar structure of these materials, test results have shown no signs of embrittlement even down to —80°C. Plastic chain is easy to manipulate at low temperatures. For example, it will not stick to the hands.

Tensile Strength—The shell material has a tensile strength of several kilograms per sq mm. It also has good slipping properties. The tensile strength of the glass-fiber reinforced core is also good. Since the core of the chain carries the load, the ability of the shell to carry loads isn't too significant.

It's too costly to make the chain in diameters smaller than 8 mm. The reason for this is that shell thickness must remain the same regardless of the chain's dimensions.

When Fracture Occurs—If steel chains are Pulsator fatigue tested by applying an alternating load between a small initial one and the safe working load, oscillations prior to fracture will seldom exceed 150,000.

The government-controlled Materials Testing Institute in Dortmund carried out tests on plastic chain. The results show that glass-fiber reinforced plastics rupture only after 400,000 reversals of load.

Future uses for plastic chain involve materials handling, conveying equipment and construction.

Rustproof Jobs—In the field of corrosion resistance, there are many avenues for growth. Three areas are most prominent. They are chemical processing, pickling and electroplating.

Its resistance to the effects of salt water make glass-fiber reinforced plastic chain a likely candidate for jobs in shipping, harbor construction and guard rails.

How Strong Is Reinforced Plastic Chain?

Link diameter, mm	Inside dimensions, mm	Weight per meter, kg	Safe working load (vertically suspended), kg	Elastic deformation of working load, pct	Ultimate load, kg	Elongation after fracture, pct
10	35 x 14	0.40	400	3	2000	16
13	36 x 18	0.80	600	3,5	3600	17
13	65 x 18	0.57	600	3	3600	13
13	82 x 24	0.59	550	3,2	3200	14
16	45 x 22	1.10	900	5,5	5400	18

Specific weight: approx. 1.7 kg per dm^3

Nuclear Device Keeps Tabs On Blast Furnace Burden

Latest on the list of recent gains in blast furnacing is automatic control of the charge.

A new device uses gamma radiation to continuously monitor the burden level.

▪ Despite the near doubling of blast furnace production rates in recent years, optimum performance is yet to come.

One important area under study is automatic charging control. Already designed are systems which automatically mix and charge the exact blend of ore limestone and coke into the blast furnace.

A Step Further—A new control system, called Stockray, goes a step further toward obtaining optimum blast furnace performance. It uses nuclear techniques to detect and monitor burden level.

The electromechanical research department of the Republic Steel Corp. developed Stockray. The first system was installed on an operating blast furnace in Chicago in late 1958. A second system was installed in Buffalo in 1960. Both have been in continuous operation since. A furnace shutdown for maintenance work has never been required.

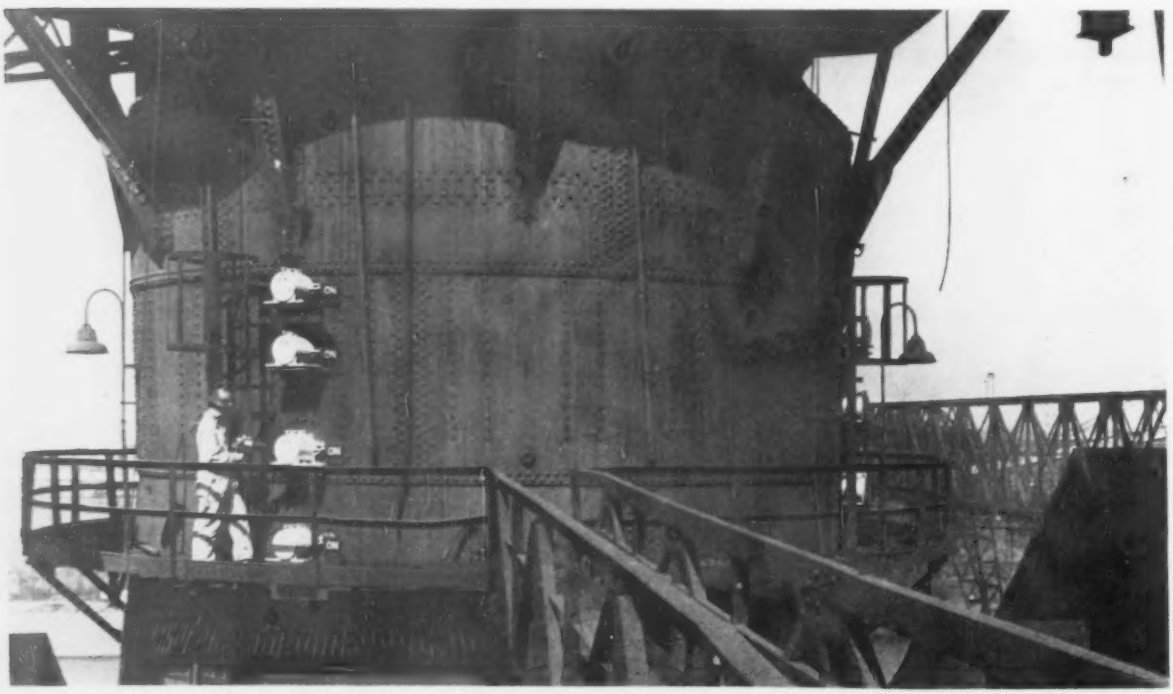
Cutler-Hammer Inc., Deer Park, Long Island, has signed licensing agreements with Republic Steel. They enable C-H to design, build and sell Stockray systems based upon the proven design.

How It Works—On one side of the furnace Stockray uses a set of radioactive sources which emit gamma rays. A like arrangement of radiation detectors is on the opposite side.

By proper arrangement of the lights, one sees a graphic distribution of the stock level. Bell dumpings, as well as stock levels, can be shown on the recorder.

The detectors recognize the presence or absence of gamma radiation directed from the sources. When the stock inside the furnace obstructs a radiation beam, it obscures the signal to the corresponding detector.

The output from each radiation detector box feeds to its amplifier and control circuit in the main control cabinet. A signal light for



MONITORS BLAST FURNACE: Radioactive Cobalt-60, stored in lead-lined containers, is mounted below the bell of the Republic Steel Corp. blast furnace. Gamma radiation continuously monitors burden level.

each stock-level detector indicates when the burden dips below each detector level.

Stockray is unlike general level-detection equipment. It's designed especially for blast furnace burden-level application. Emphasis is on rugged construction to withstand the extreme environments of the blast furnace area. Ease of maintenance is another feature.

Buttons for Checking — Several features of Stockray add to the simplicity of maintenance and testing. A minute radiation source is mounted within each detector box for testing and calibration. By means of buttons on the control cabinet, the entire system can be checked. This eliminates climbing up the blast furnace for making tests.

The arrangement of sources and detectors determines the significance of the signal light indications. Various mills might desire different configurations. Stockray fully meets this requirement.

Cobalt 60 was chosen as the radiation source because it produces gamma rays—noted both for their penetrating power and safety. They induce no radioactivity in any material they strike, points out Cutler-Hammer.

Compact Source—The Stockray uses a small strength source which permits the use of a small source holder. The holder weighs 500 lb and is made of stainless steel and lead.

A special sliding door, incorporated into the holder, remains closed until the source is mounted upon the furnace and ready for operation. By this means, radiation levels in the immediate vicinity are maintained at a safe value.

Since each detector has its own channel, the system can continue to operate in the unlikely chance that one or more channels are out for repairs.

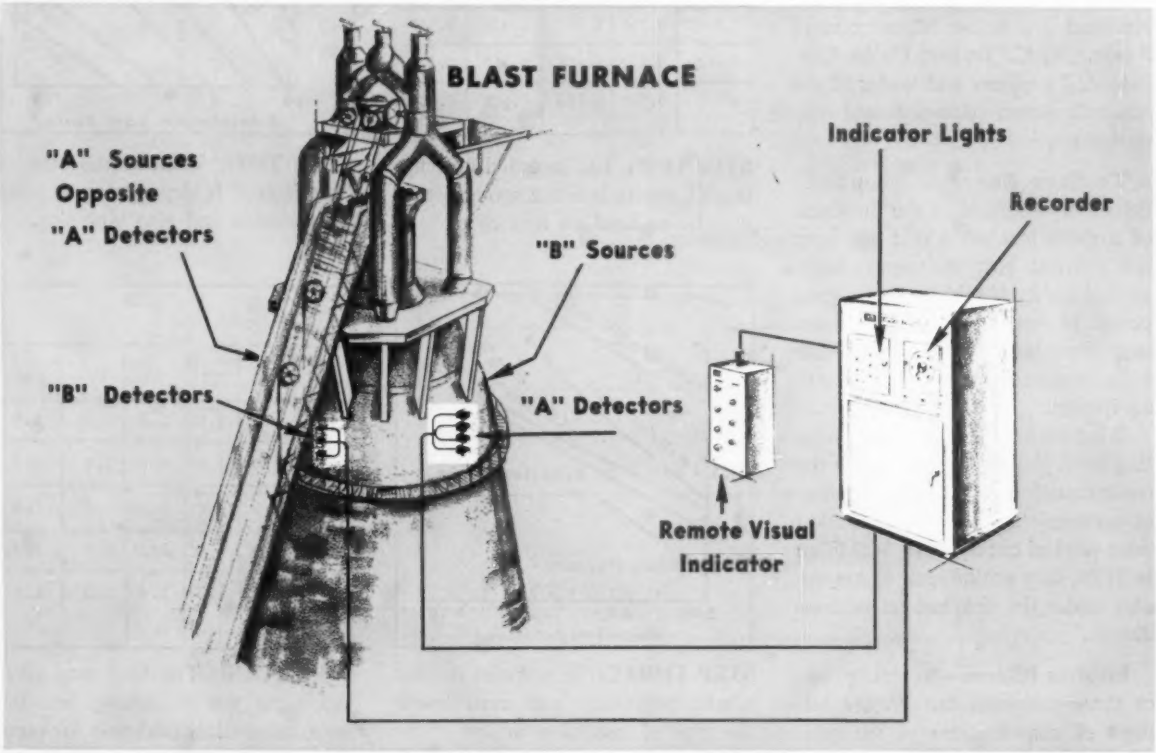
The design incorporates the maximum number of functions and components within the control cabinet to minimize the components in the detector. This reduces the possibility of personnel performing maintenance work on detectors from furnace catwalks.

When to Install—Stockray installation involves two phases—radiation beam ports and the nuclear gage equipment.

Radiation beam ports can be installed only when the blast furnace is being relined or during the construction of a new furnace. The installation of Stockray equipment can be made either during relining or later when the blast furnace is is back in operation.

The proper design and installation of ports is essential to the correct functioning of Stockray. Once the ports are in place no changes can be made until the next relining. Normal furnace lining shifts should not affect Stockray when the job is done properly.

How Remote Detectors Monitor Furnace



How to Improve Heat Efficiency In Your Insulation System

Too many pipes are either over- or underinsulated. Waste runs into millions of dollars yearly.

A new calculating approach gives the economic insulation thickness in minutes.

■ A practical means for specifying the most economical thickness of thermal insulation has been achieved. Applicable to any type of heat-using industry, it's predicted that the new system can save a company millions of dollars a year.

The system was developed by engineers at the Union Carbide Chemical Co., South Charleston, W. Va., in cooperation with the College of Engineering, West Virginia University.

Announcement of the new system was made at a recent meeting of the National Insulation Manufacturers Assoc. W. C. Turner, Union Carbide staff engineer and leader of the research team, demonstrated the procedure.

To Save Energy—Economic thickness is defined as the thickness of a given insulation that will save the greatest cost of energy while paying for itself within an assigned period of time. Savings accrue not only from lower heat loss but also from reduced size of pipe and equipment.

What then is the economic insulation for a given pipe? Although the basic equations for the calculations of economic thickness of insulation were worked out by L. B. McMillan in 1926, they are difficult to use except under the simplest set of conditions.

Involves Billions—Normally, one of these problems can involve billions of combinations of variables which range from cost of heat and insulation to various conductivities of insulations.

Practical limits for insulation studies are given in the table. All the sets of curves for each variable condition of costs, shape, conductivity of insulation, and temperature difference would total 53,787,880,000, estimated Mr. Turner.

"The device which broke the impasse was a separation of cost factors from the thermal constants. William Hollenbeck of our company discovered that the cost factors could be resolved into a single variable, the D factor, which could determine the curves in proper relation to the thermal equations," Mr. Turner said.

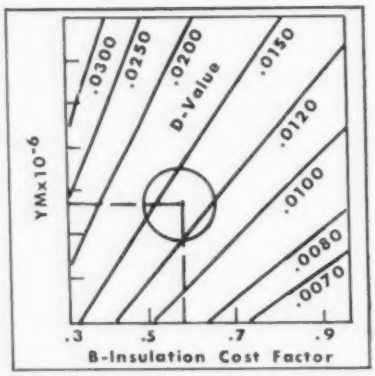
Saved 500 Years—Using an IBM

Continued on page 138

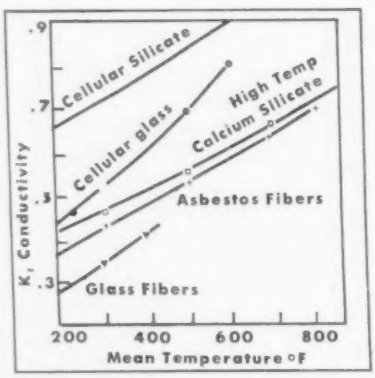
Clues Are Found in Charts

N_n / Size	C = 1/10			
	5 Yr	10 Yr	15 Yr	20 Yr
1/2"	0.565	0.383	0.327	0.289
3/4"	0.590	0.400	0.341	0.301
1"	0.657	0.445	0.380	0.336
1 1/4"	0.757	0.513	0.438	0.387
1 1/2"	0.617	0.418	0.357	0.315
2"	0.850	0.576	0.491	0.434

STEP ONE: The installed cost figure, C, determines the group of figures to be used on first chart.



STEP TWO: What is the cost of heat factor? It depends upon plant depreciation and also pipe size.

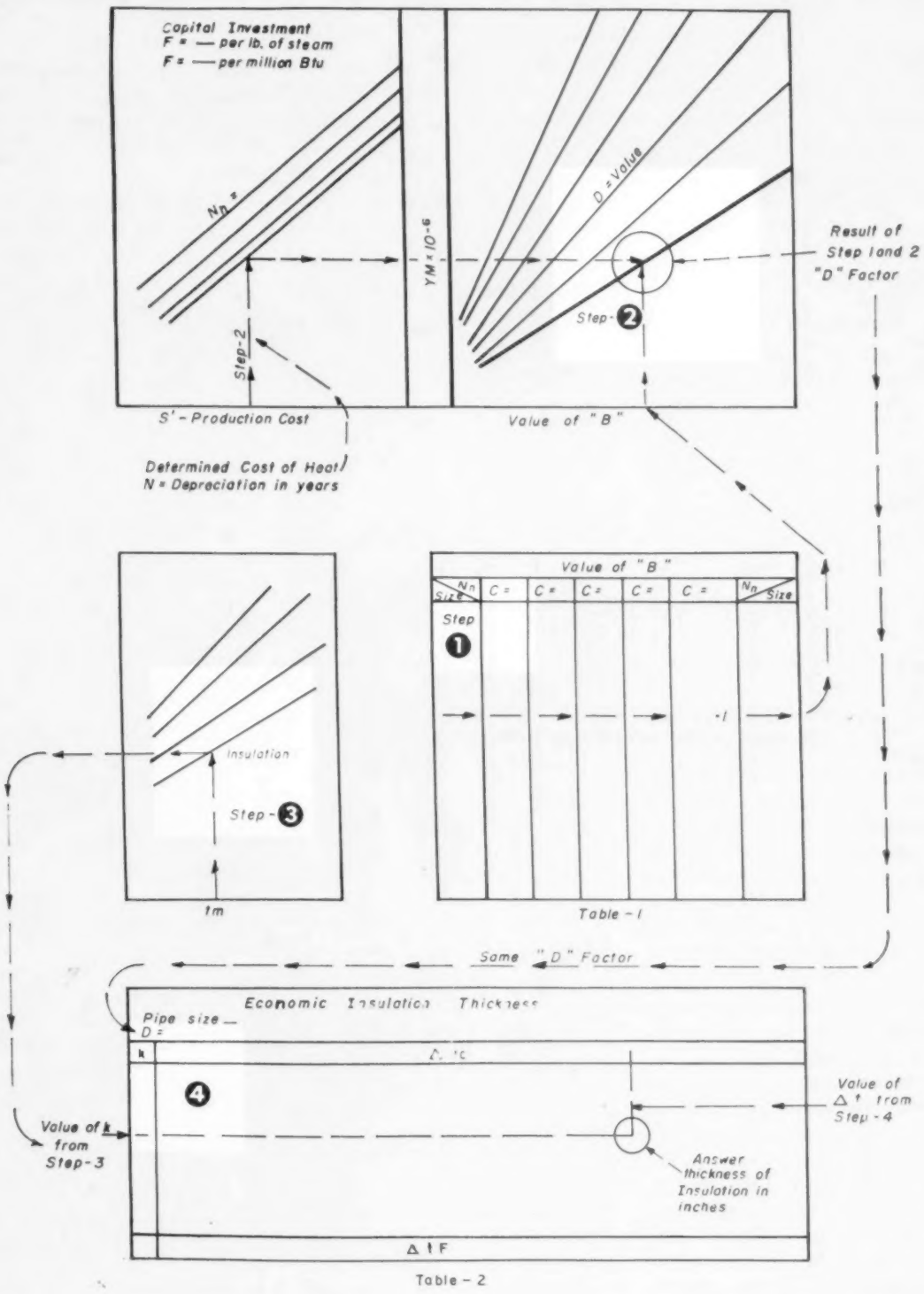


STEP THREE: To pinpoint insulation conductivity, you must know the type of insulation in use.

D - 0.0120					
k	50	70	90	110	130
0.1	0.5	1.0	1.0	1.0	1.0
0.2	1.0	1.0	1.0	1.0	1.5
0.3	1.0	1.0	1.5	1.5	1.5
0.4	1.0	1.0	1.5	1.5	1.5
0.5	1.0	1.5	1.5	1.5	2.0

STEP FOUR: The final step gives you what you're looking for: the most economical thickness for pipe.

Four Charts Simplify Problem Solving



Variables Magnify Problem

Variables and Limits of Economic Thickness Study

Variable	Number of Increments	Range
Heat Costs		
Capital Cost	7	$8.00 – 18.00/lb-hr
Depreciation Rate	4	5 – 20 yr
Production Cost of Heat	90	$0.20 – 2.00/1000 lb
Interest Rates (fixed as constant)	1	
Insulation Costs		
Capital Cost	21	$.50 – $2.50 in./insulation-linear ft
Depreciation Rate	4	5 – 20 yr
Interest Rates (fixed as constant)	1	
Shape		
Flat	22	½ in. IPS – 36 IPS and flat
Curved		
Thermal Conditions		
Conductivity of Insulation	15	0.1 – 1.5 Btu/sq ft/in/°F
Temperature Difference	35	90 – 13.4°F
Shape		
Flat	22	½ in. IPS – 36 IPS and flat
Curved		

7 x 4 x 90 x 21 x 4 x 22 x 15 x 35 x 22 = 53,787,880,000 charts.

* Flat refers to any surface with a radius greater than 18 in.

Continued from page 136

650 computer, a team of engineers and mathematicians reduced to 141 pages of graphs and tables in 83 hours what would have taken 1052 pages and 500 man years if worked on the fastest electric calculator.

Referring to only four charts rather than laboriously working out complex mathematical formulas, an engineer can quickly find the answer to any insulation problem.

In practice, any realistic combination of conditions, including possible increases or decreases of costs at least 20 years away, are included in the tables. Twenty-two pipe sizes and flat surfaces, temperature differences ranging from 90°-1314°F, and insulation conductivities from 0.1-1.5 are covered.

Takes Only Minutes — Consider the sample problem shown on the last page. The installed cost figure, C, determines which vertical group of figures are used on the first chart. Reading down the proper depreciation column until it intersects the pipe size gives the B factor.

The next chart gives a cost-of heat factor D. Enter the graph with S' and read up to the curve Nn for the plant depreciation period. Then read across the graphs to a vertical line up from the value of B determined in the first chart. This gives D.

To determine insulation conductivity, enter the chart at the mean temperature, tm; read up the curve for the type of insulation being used, and across to the conductivity factor on the left axis.

Gives Economic Thickness—Using the table for the appropriate pipe size and D factor, read in from the left to the correct temperature differential. This step gives the economic thickness.

Using these charts, the solution takes only a few minutes. Solving the same problem with the original McMillan formulas would take about four hours, Mr. Turner estimates.

Fertile Field—Pointing out management's stake in the project was F. G. Comerford, manager of engineering services, design and construction, Union Carbide Chemicals Corp.

"Three to six per cent of the many millions of dollars spent on construction by Union Carbide since World War II went into thermal insulation, a fertile field for improvement and economies."

Comparing older installations with new designs worked out according to the manual gave significant results, noted Mr. Comerford.

Lines from ambient temperatures up to 700°F, which compromise about 85 pct of the total in industry, were found to be underinsulated by 30-50 pct. Lines at temperatures over 700°F had been regularly overinsulated.

Fuel Supplies Are Factor—C. A. Arents, dean of the W. Va. College of Engineering, stressed the board national implications of the long-term conservation of energy made possible by the rational use of insulation.

"We have two interrelated problems of national, indeed universal interest: To save money, and to protect our precious fuel supplies. An ideal economic balance is attained when the cost of energy plus the cost of installation is a minimum. Our spot checks indicate that most lines are underinsulated.

"Any company using the manual could base its determination of economic thickness on its own cost conditions." So whatever your interest, "you will find this manual a short cut to conservation of investment and operational dollars."

Germanium Gets a Finer Polish

Electrochemical Method Raises Surface Quality, Aids Transistors

Polishing metals, such as germanium and silicon, is no easy trick when a super-fine surface is needed.

A new electrochemical method does just that at lower cost.

■ One of the major problems in making transistors is to hold down surface damage on the semiconductor—the active element for the device.

Bell Telephone Laboratories, Murray Hill, N. J. claims its new electrochemical polishing method is the answer.

Besides pointing up distinct gains in the electrical characteristics of certain types of devices such as germanium and silicon wafers, the new polishing method saves the user up to 50 pct in polishing costs.



NO SCRATCHES: The electrolyte, in the glass container, drops onto the rotating wheel and spreads. The film supports the wafer at an almost constant distance from the wheel. Film thickness depends on viscosity.

Partly Removes—When scratches result from lapping and conventional polishing, an etchant cannot remove all the damage. Thus, poor-quality transistors result. In contrast, electrochemical polishing does not introduce new damage.

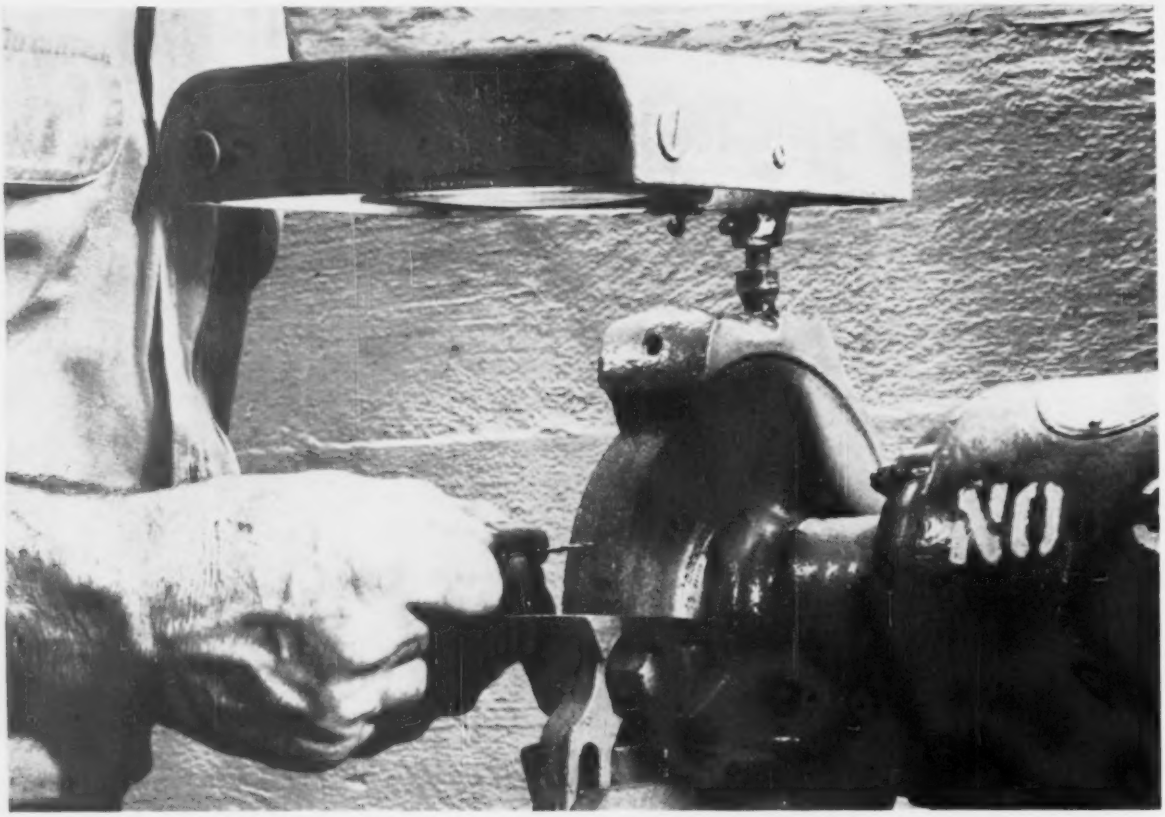
In the technique, semiconductor slices are mounted on a nonconducting disk. The slices make electrical contact after they're placed on a polishing wheel over which an electrolyte flows.

When the polishing wheel rotates, the electrolyte film separates and automatically holds the wafer at almost a constant distance from the wheel. The electrolyte's viscosity dictates film thickness.

Film Types — Germanium calls for dilute potassium hydroxide as the electrolyte, while dilute hydrofluoric acid fills the needs for silicon. While "electroetching" germanium or silicon, it's desirable to illuminate the wafer's surface.

The smooth surface obtained by this method is seen in photomicrographs of comparative surfaces.

Wafers, polished by this new technique, exhibit no sign of surface roughness—even under electron-microscope examination at 53,000 power. On the other hand, mechanically polished surfaces show distinct scratches at 500 power. Broken pieces of abrasive and wafer, ground into the surface, cause the scratches. The wafers were formerly lapped with a coarse abrasive, then polished on optical lapping machines.



MAGNIFYING GLASS: An eyeshield made of magnifying glass is a must for fine grinding operations.

Tricks of the Trade Pay Off In Machining Stainless

By **G. J. Stevens**—Machining Engineer, Armco Steel Corp., Middletown, O.

Many shops have devised their own shortcuts for machining stainless steels.

Here are a few pointers which should help you ease some of those drilling chores.

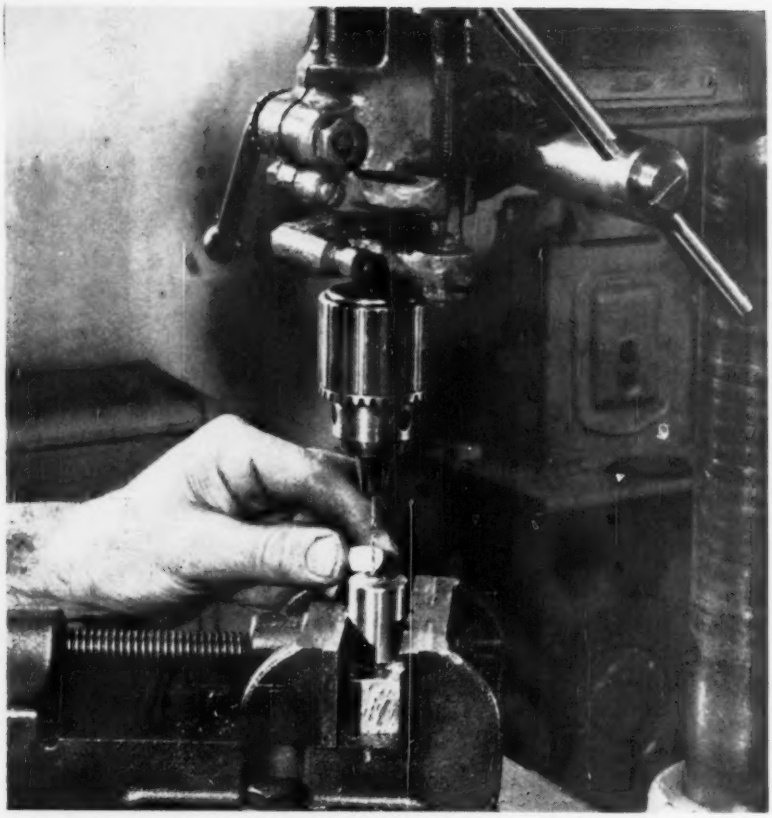
■ The many shops that specialize in high-volume machining owe their success to single- and multiple-spindle automatics. To keep these machines running, it takes basic set-up procedures combined with know-how and a large bag of tooling tricks. This is especially true when you're working with stainless steel.

Use the correct tools and equipment and you can machine all stainless grades. By applying a few tricks of the trade, however, machining of stainless becomes faster and more efficient.

The free-machining grades of stainless yield short chips, in most instances, which are easily handled. For grades without free-machining additions, chip elimination can be a major problem.

The use of standard tooling on the more troublesome grades often results in the production of long, stringy chips. These chips get between the tools and the rotating workpiece, thus causing premature tool wear or breakage. Then the operator must stop the machine at frequent intervals to clear the chips.

Cast Alloys—Certain types of automatic tooling, made from carbides, do not lend themselves readily to chip control methods. Through ingenuity and tool modi-



CHALK MARKS: Apply chalk on the workpiece and drill point of a small drill in a large chucking to overcome glazing problems.

fication, often something can be done to help this situation. If not, the carbides should be removed and cast alloys used instead.

This approach may reduce tool life slightly, but cast alloys can be easily ground. Modifications will increase output by better control of the chips.

Drilling, particularly deep drilling, on single- and multiple-spindle machines can also present a chip elimination problem. One way to clear the chips is to use a chip curler. Other methods involve a breaker or groove, a flat or a compound angle ground on the drill point.

Depth of Drill—In a conventional deep-drilling operation when the first drill insertion cuts to a depth of three drill diameters, the second insertion is usually one and one-half times the drill diameter.

The third insertion, often made with another drill, is about one-half the drill diameter. Here is where the chip curler groove will permit an increase from one-half to one full drill diameter.

Cams designed for frequent insertions and rapid pullouts are also used successfully for deep-drilling operations on modern single-spindle machines.

The Grinding Wheel—A well-lighted grinding wheel is good shop practice in all tool grinding, especially for small drills. An eyeshield made of magnifying glass is a must for these fine grinding jobs. If only a regular glass shield is available, place a hand magnifying glass on top of the regular shield.

Drill grinding by hand is an art. Nevertheless, it's invaluable in handling many drilling problems. Various types of drill grinding equipment also do a very good job, particularly when exact duplication of more than one drill is required.

The web on a drill is of great concern, too. The thickness of this web is responsible for the high percentage of torque or power required to cut. It should be thinned down for most stainless jobs, especially for small drills. Here, web thicknesses are larger by comparison with bigger drills.

Web Thinning—The web gets wider and wider as the drill is shortened, either by grinding or for any other reason. You can't overlook web thinning when striving to reduce torque and point pressures.

Despite drill modifications, the machinist can still get into trouble with small drills when he has to use them on drill presses with capacities as high as ½ in. Normally operated at top speed to obtain the cutting rates small drills need, large drill presses aren't sensitive enough to control the fine feeds required.

Small drills tend to glaze when starting or restarting a cut. It will help to reduce the spindle speed below the normal cutting rate.

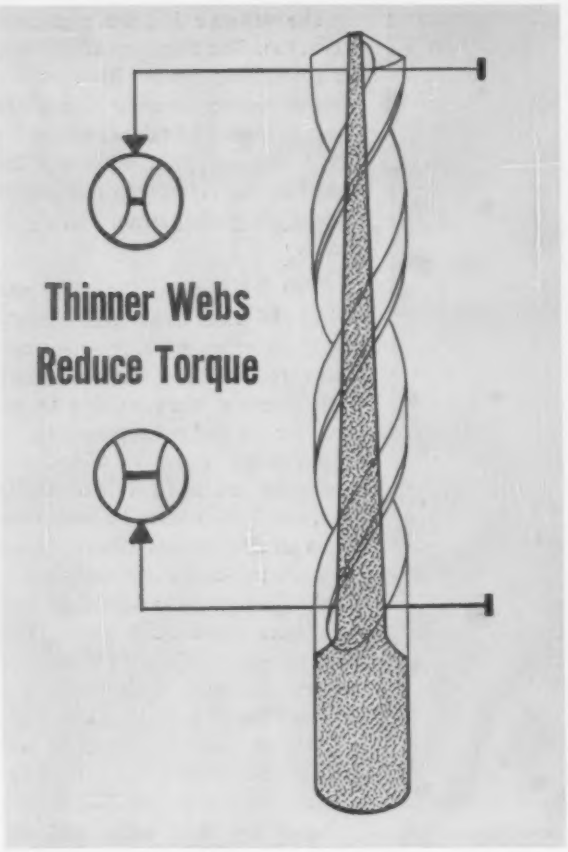
Mark the drill point and the workpiece with chalk. In so doing, the drill can start cutting through the glazed surface, thereby permitting frequent backouts to clear the chips without further danger of glazing.

Drill Pressure—Drills from ¼ in. and up are all right in large presses but the pressure the operator exerts to secure these larger drills tends to distort the chuck jaws to some extent. However, these large drills provide bearing surface to hold firmly and run true.

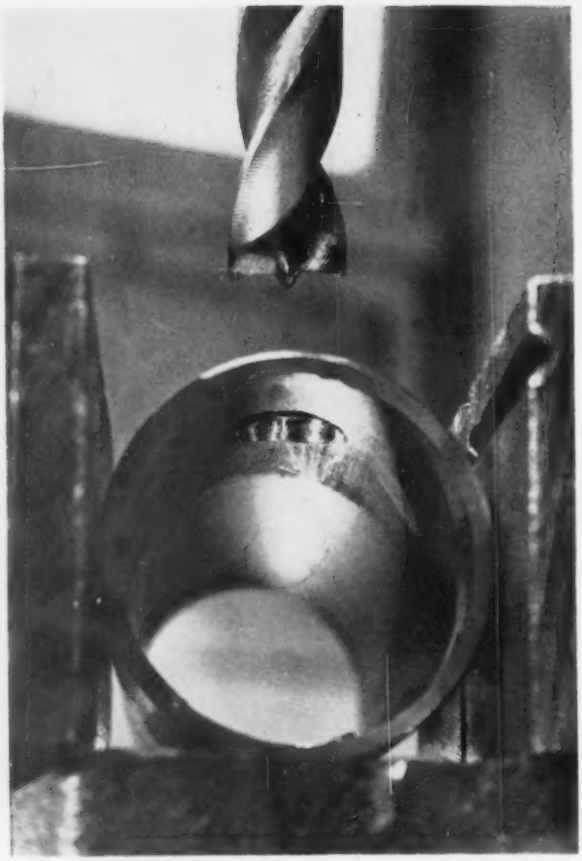
If smaller drills are used in the same chuck, say 1/16 in., this small drill won't run true. The pressure used to hold big drills distorts the jaws enough so they can't grip small drills properly.

Held at only one or two points, it's almost impossible to align the drill. The result is wobble and excessive runout. A longer drill than needed has to be used just to get the jaws to hold at all.

One solution to this problem is a



WIDENED WEB: A wide and thick web increases torque and point pressures. As a result, webs should be thinned for a majority of stainless applications.



THIN SECTIONS: A trepanning cut will penetrate thin-walled tubing or sheet cleanly. The modified drill actually resembles a wood bit in appearance.

small precision press that is designed for this type of work. Its light, balanced spindle cuts down vibration and permits the use of proper cutting rates.

Bushing Problem—A drill fixture bushing that locates directly on the work is another drill press problem. This type fixture doesn't allow any clearance between the bushing and the workpiece for proper chip elimination. As a result, the drill is forced to cut its own shape, giving the apparent effect of hard spots in the metal.

Most drill bushings can be made shorter without impairing the work. A clearance of one drill diameter between the bushing and the work is a good rule of thumb to follow. This will prevent the chips from clogging the bushing and workpiece. It also improves tool life.

The shorter this bushing can be made without impairing the work, the better. It permits the use of a shorter drill, which is always desirable where small holes are concerned.

If the bushing must be located directly on the workpiece, a flat ground on a small drill, or a groove on large drills, will help this condition.

Tears and Burrs—Another operation that can cause trouble is drilling large holes in thin sheets or thin-walled tubing. A conventional drill will often tear the sheet or tubing or even leave burrs on the underside. Because of the danger to the operator if the drill jams, costly hold-down methods are required for his safety.

A radial change in the conventional drill point solves this problem. The point is modified with a grind much like that in a wood bit. Such a trepanning cut will penetrate a thin wall or sheet without tearing the work or leaving burrs.

Double margin drills are being used more and more for deep drilling stainless because of their good concentricity. These drills have five bearing surfaces and provide a balanced support. You don't get that from conventional, single margin drills.

Here's the problem one shop faced. The holes held good concentricity but they were oversize (even though the correct diameter drill was used). The operator used a flat ground on the point of the drill. The drill then worked well. The holes still held concentricity and the oversize condition was corrected.

NOW!

READY PACK IN ROLLS...

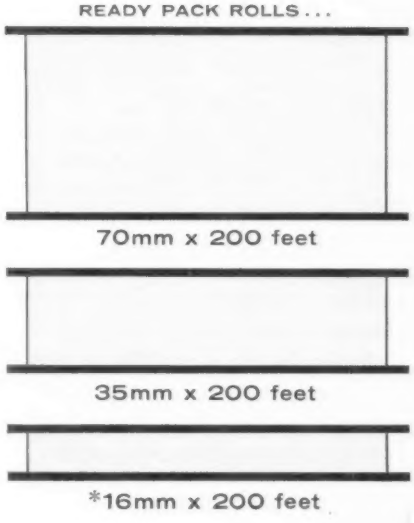


Kodak Industrial X-ray Film, Type AA and Type M in 16mm, 35mm and 70mm widths, 200-foot lengths

Here is America's preferred Industrial X-ray Film in a new convenient form—in 200-foot rolls, and in three widths. Ready Pack rolls are the answer for panoramic or moving slit methods of radiography of thin-wall vessels and pipe, honeycomb, circumferential welds, etc. Unroll the needed film, cut it off, seal the ends with opaque, pressure-sensitive tape. You are ready to inspect aluminum or magnesium alloys, thin steels or anything where lead screens are not required.

Ready Pack rolls are supplied on cardboard cores, 12 inches in diameter. The film is enclosed in a light-tight wrap-around sealed covering, without interleaving paper. It keeps clean and does away with darkroom loading. For processing, just separate the wrap along the sealed edge and remove the film.

For further information or to order a supply, contact your x-ray dealer or write us for a Kodak Technical Representative to call.



*For the present this size available only on a special order basis.

EASTMAN KODAK COMPANY
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TRADE MARK

Spaulding **FIBRE FACTS FOR ENGINEERS** NUMBER 4

How to Punch Vulcanized Fibre to Reduce Fabrication Costs

by K. H. Alverson, Product Standards Director

Vulcanized Fibre's capacity for easy punching makes this material highly attractive to the designer whose application calls for characteristics such as good dielectric strength, light weight, rugged strength, irregular contours and holes and indentations in the surface of a part.

Punching is done with two kinds of precision: Rough punching uses the lowest cost solid dies, is rapid and economical, but leaves a fractured raw edge and is limited to stock thicknesses through $\frac{1}{4}$ in.; smooth shaving uses a contour die ground to a sharp edge that slopes away at 45°. The edge shaves stock when the part is forced into the die producing smooth edges in parts up to 1 in. thick. Holes can be punched easily, but should be generally spaced from each other and from any edge by at least the thickness of the stock. Noncircular holes and counterbores should be made circular for machining when the stock thickness specified is too thick to punch.

For thickness under 3/64", vulcanized fibre can be punched most economically with steel rule dies. Dies for simple parts usually cost much less than solid dies even for irregular contours. Tooling for scoring or creasing can also be added with little additional cost.

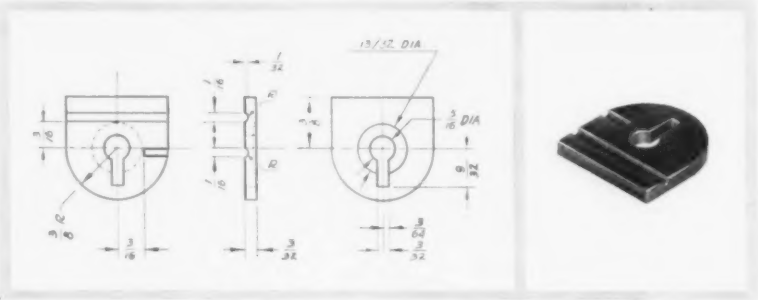
Most parts can be punched without additional conditioning if the vulcanized fibre has its normal moisture content of 5½ to 7%. For especially difficult punchings, or for parts thicker than $\frac{1}{8}$", heating up to 200°F may be desirable.

Additional economies may be obtained in thicknesses 1/16" and under by using coils slit from parent rolls, reducing waste of stock, speeding up the punching operation, and reducing inspection costs.

Many extras may be incorporated in punching operations on vulcanized fibre. These include scoring or creasing for subsequent forming along established lines. Also practical are swaging or forming into special shapes, such as shoulder bushings or angles.

Stamping letters and numerals into the surface of vulcanized fibre in the punch-press operation produces permanently legible markings with no increase in cost of the part. White or colored roll leaf characters can also be impressed into the surface to give color contrast at very little added cost. Punched parts are also readily printed with rubber stamp.

Spaulding Engineers who have been trained in Value Analysis can help you take advantage of the wide range of possibilities in designing to reduce costs through the use of vulcanized fibre parts. They also make available to you Spaulding's extensive fabricating facilities and experience in working with this extraordinary material.



The fabrication of this shut-off switch insulator demonstrates vulcanized fibre's facility for punching and swaging. Previously moulded out of nylon, the part is now made by swaging both sides and punching vulcanized fibre — all in the same operation and at lower costs both for material and processing.

Send for your FREE copies of this literature



Value Analysis Brochure — case histories of design improvement and cost reductions that have been accomplished through Spaulding's value analysis of customer products.



Vulcanized Fibre Engineering Data — a design reference book which comprehensively covers all the application specs of vulcanized fibre.

SPAULDING FIBRE COMPANY, INC.

309 Wheeler Street · Tonawanda, New York

See our Display at the Design Engineering Show, Booth 939

NEW PATENTS

Unabrasive Iron Shot

Manufacture of iron shot, L. P. Wilson and R. L. Turner (assigned to Olin Mathieson Chemical Corp.), Mar. 7, 1961. In the production of unabrasive shot, the shot is poured and cast from substantially pure iron. Then, without any mechanical working, it's heat treated in a hydrogen atmosphere. U. S. 2,974,031.

Removes Oxide Film

Method of treating stainless steel, E. A. Hahn (assigned to Lyon Inc.), Feb. 28, 1961. Method for removing iron oxide films or coatings from stainless steel cleans the surface for chrome plating. An alkaline bath anodically cleans the steel which is rinsed, dipped in acid, and then immersed in the chromium plating bath. U. S. 2,973,307.

Steel Additive

Nodular graphite steel, T. Ototami (assigned to Research Institute for Iron, Steel and Other Metals of the Tohoku University, Sendai City, Japan), Mar. 7, 1961. To prevent formation of free cementite in a high-carbon steel containing nodular graphite, a small amount of calcium and/or cerium is added to the molten bath. U. S. 2,974,035.

Produces Grate Bars

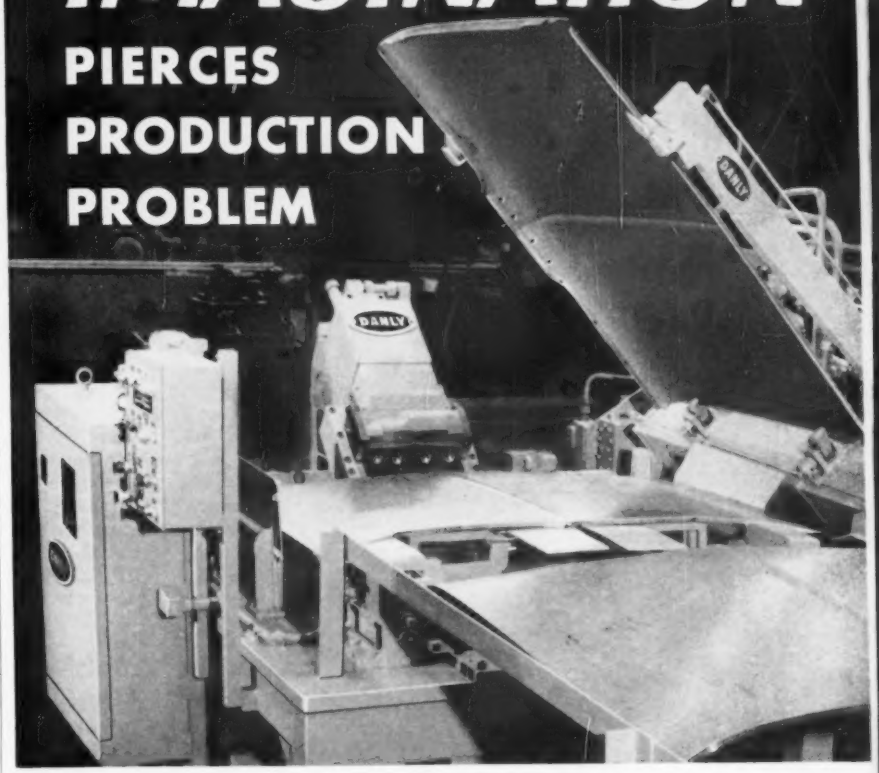
Iron-oxide grate bars, K. M. Meyer (assigned to Metallgesellschaft A. G., Frankfurt on the Main, Germany), Feb. 28, 1961. A method produces high-strength, non-warping, iron-oxide grate bars for use in place of cast-iron bars in an iron-ore sintering apparatus. A mixture of iron-oxide powder and water is pressed into bar shapes. Then the shapes are dried and fired at 1200-1500°C. U. S. 2,972,989.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

DANLY

IMAGINATION

PIERCES PRODUCTION PROBLEM



This Hydraulic Piercing and Turnover Unit, designed and built by Danly for a major automobile manufacturer, automatically pierces ornament mounting holes in hoods as they come off the forming press. And it handles 600 hoods per hour! Then it turns them over for the next operation. Versatile! Practical, too—because it eliminates the need of a press for piercing and a separate turnover unit. Typical of the Danly engineering that applies hydraulics and imagination to speed production and cut costs.

Danly's complete line of Hydraulic Platen Presses and hydraulic cylinders offers you the tools to solve virtually any compression molding, bonding, laminating, trimming, extruding or piercing problem in processing metal, plastics, or rubber. They're precision units with accurately machined platen faces, positive parallel platen closure, uniform pressure distribution and extra, rigid strength. And Danly's versatile engineering adapts these tools to *your specific needs.*

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HYDRAULIC PRESS CATALOG shows all the features, sizes, adaptations—all the reasons why you should invest in a Danly. Write for your copy.



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DANLY MACHINE SPECIALTIES, INC., 2100 South Laramie Ave., Chicago 50, Ill.



Save on any size rings with Amweld

Amweld makes flash butt-welded rings in diameters of four inches to eight feet and offers ring customers a sizable cost reduction in every case. Amweld rings save on metal, because rings are formed to or near finished dimensions. Amweld rings save on machining, because the metal is left out—not hogged out. Important to you, Amweld can flash weld rings from almost any metal alloy, common or exotic.

Savings to all Amweld customers totaled over one million dollars last year. One Amweld customer saves by using Amweld rings as gear blanks. Another saves by using Amweld rings as tank flanges. A third saves on rings for jet engine applications. It doesn't cost a thing to think on paper with Amweld. So let us quote you for your cost comparison. Write today: The American Welding & Manufacturing Co., 701 Dietz Road, Warren, Ohio.

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INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MANUFACTURING CO., WARREN, OHIO

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Lists Key Servo Data

Detailed specifications are given in a data sheet to aid in rapid selection of size 23, 60-cycle synchros for servo applications. It includes more than 25 vital characteristics for transformers, differential transmitters and receiver transmitters, all engineered to MIL-S-20708A specifications. (Vernitron Corp.)

For free copy circle No. 1 on postcard

Conveyor Systems

In its 56 pages, a 2-color brochure on conveyors incorporates many illustrations of engineered systems. It also shows special applications, with package- and bulk-handling equipment in a wide variety of industries. The brochure outlines engineering services the company offers. (Conveyor Systems, Inc.)

For free copy circle No. 2 on postcard

Bores and Mills

A folder illustrates the important features of a new horizontal boring and milling machine. It analyzes design improvements and furnishes specifications. (S & S Machinery

For free copy circle No. 3 on postcard

Heat-Treated Drills

An informative booklet tells about a process for producing drills from heat-treated, mill-length bars of hardened, high-speed steel. (Ace Drill Co.)

For free copy circle No. 4 on postcard

Space-Age Metals

First-issue highlights of a new quarterly bulletin entitled "Nuclear/Space Materials" include features on the control-rod guide and fuel-shroud assembly of the nuclear power plant at Elk River, Minnesota. (Dresser Products, Inc.)

For free copy circle No. 5 on postcard

Lift Trucks

In a new 16-page catalog, photographs and other illustrations visually help tell about design, engineering construction and operating features of a lift-truck line. The pages give information on components and power plants, as well as power curves and specifications. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 6 on postcard

Bending Presses

Bending press brochure supplies 12 pages of illustrations, design features and descriptions of a comprehensive line. It outlines the principles, advantages, procedures and limitations of the eight models offered. (Pines Engineering Co., Inc.)

For free copy circle No. 7 on postcard

Hose Adheres to Rubber

An easy-to-use catalog sheet lists technical data on a line of hose wire. It gives test results showing the ability of the hoses to adhere to rubber. (Riverside-Alloy Metal Div., H. K. Porter Co.)

For free copy circle No. 8 on postcard

Teflon Products

Processes, products and quality-control procedures in the manufacture of Teflon and Kel-F shapes are described in a 4-page brochure. (The Fluorocarbon Co.)

For free copy circle No. 9 on postcard

Stamping and Dies

Prepared in three colors, a folder displays many photos of die-making and production equipment in opera-

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **4/20/61**

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FREE LITERATURE

tion. It lists tool-room equipment and shows a wide variety of stampings processed in the past. (Kalamazoo Stamping and Die Co.)

For free copy circle No. 10 on postcard

Processes Strip Metal

This gatefold bulletin covers the use of vertical and horizontal equipment for processing continuous strip. Heat treatments discussed are for ferrous and also non-ferrous strip metals. They involve annealing, normalizing and galvanizing. (Surface Combustion Div., Midland-Ross Corp.)

For free copy circle No. 11 on postcard

Forming Machine

For the production manager, industrial engineer and tool engineer, a design handbook explains a special forming machine. The unit utilizes the interaction of four slides directed toward a common center to form wire and ribbon metal. (The A. H. Nilson Machine Co.)

For free copy circle No. 12 on postcard

Controls Motors

All the details about a motor control for regulated speed and exact positioning are contained in a 2-color bulletin. The control is good for missile guidance, numerical machine tools, automatic fusion-welding units and general automation. The literature presents graphs, data and examples. (Sciaky Bros., Inc.)

For free copy circle No. 13 on postcard

Welded-Steel Tube

New and comprehensive, a manual includes the latest design data on the manufacture of electric-resistance-welded, carbon- and stainless-steel tubing. It compiles engineering facts valuable to architects, designers, engineers and fabricators of tubular products. (Welded Steel Tube Institute, Inc.)

For free copy circle No. 14 on postcard

Buffs and Polishes

In 20 pages and two colors, a letter-size catalog describes a complete line of semi-automatic machines for low production deburring, buffing and polishing. It also gives the details on newly-developed accessories and attachments that increase the efficiency of finishing operations. (Acme Mfg. Co.)

For free copy circle No. 15 on postcard

Compares Steels

An improved and simplified chart, issued by a metal service center, shows comparable tool steel and carbide grades of different manufacturers. It lists typical analysis and characteristics of the company's major steel grades. (Brace-Mueller-Huntley, Inc.)

For free copy circle No. 16 on postcard

Facts on Corrosion

Metal fasteners and corrosion resistance are discussed by a brochure. It's written to help manufacturers build corrosion resistance into their products. The guide analyzes the seven basic types of corrosion and shows what specific metals best resist them. (The H. M. Harper Co.)

For free copy circle No. 17 on postcard

Converts Quick Lime

The continuous conversion of any commercial grade of calcium oxide and quick lime into paste calcium hydroxide or slaked lime is the function of a pug mill described in a new brochure. It contains illustrations, features and engineering specifications of the equipment. (B-I-F Industries)

For free copy circle No. 18 on postcard

Air Separators

Right off the presses is a 16-page, 2-color booklet on mechanical air separators. It combines pictures and diagrams with the text to present all the pertinent information about the line. It also lists the various materials to be processed. (Raymond Div., Combustion Engineering, Inc.)

For free copy circle No. 19 on postcard

Aids Alloying

In a paper discussing steel alloying, an engineer tells how to adjust the chromium content of steel in the ladle by adding exothermic ferrochromium. The additive disperses the alloying agent throughout the melt. The paper also reviews test procedures, results and conclusions. (Vanadium Corp.)

For free copy circle No. 20 on postcard

BLAW-KNOX

WIDE FLANGE BEAM and STRUCTURAL MILLS

Blaw-Knox designs and builds a full range of Wide Flange Beam and Structural Mills. Other Blaw-Knox equipment for the metals industry includes: Complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals • Sheet and strip processing equipment • Electrolytic tinning, annealing, and galvanizing lines • Seamless pipe and tube mills • Draw benches and cold draw equipment • Blaw-Knox Medart cold finishing equipment • Iron, alloy iron and steel rolls • Carbon and alloy steel castings • Fabricated steel plate or cast-weld design weldments • Steel plant equipment • Heat and corrosion resisting alloy castings. Blaw-Knox Company. Foundry and Mill Machinery Division. Blaw-Knox Building, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.

Wide Flange Beam and Structural Mill at the South Works of the United States Steel Corporation



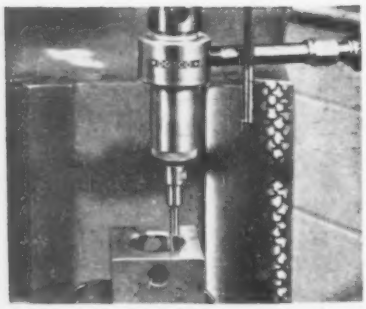
New Materials and Components



Self-Locking Socket Screw Features Nylon Insert

Red nylon pellets identify this new and complete line of socket screws. These pellets lock the screws in place and keep them there. The screws are particularly useful where the fastener must resist vibration. The nylon locking insert soaks up the vibrations and the screw stays put. Nylon wasn't a hit or miss choice. It offers the perfect combination of toughness and elasticity to do the locking job. The newcomers come in multiple-spline and hexagon styles in a wide variety of sizes. (The Bristol Co.)

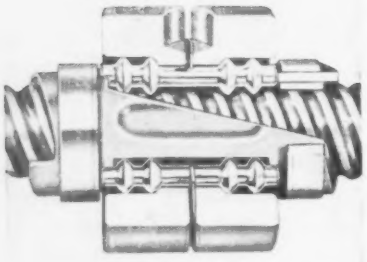
For more data circle No. 25 on postcard, p. 147



Pneumatic Grinding Unit Bores Any Size Hole

For grinding tough materials to close tolerances and smooth finishes, a versatile pneumatic hole grinder uses high power and speeds to 30,000 rpm. It inserts in the boring head of a vertical or horizontal mill, boring machine, lathe or jig borer. The unit will jig bore any size hole—before or after heat treatment. It also copes with cylindrical members. The setup is similar to that of other offset-boring work, except that this attachment substitutes for the boring bar. The units come in two sizes, with motor speeds of 25,000 and 30,000 rpm. (Doeden Tool Corp.)

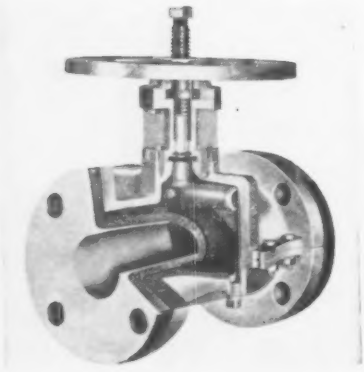
For more data circle No. 26 on postcard, p. 147



Linear Actuator Has Planetary or Positive Drive

The designer has a choice of linear advancements with a new anti-friction bearing screw. There are two types of drive assemblies. Each fills a specific need. The planetary type provides mechanical advantage or speed reduction, or both. It also features free-wheeling motion at end of travel. This protects the screw assembly. The positive drive unit gives constant linear advancement. Thus, there's a fixed relationship between linear advancement and input revolutions. This suits multiple-screw applications requiring synchronized advancements. (The Anderson Co.)

For more data circle No. 27 on postcard, p. 147



Elastomer Facings Guard Pinch-Valve Flanges

A positive-opening pinch valve has full, elastomer-faced flanges. Another new design feature assures complete opening of the valve, even when the line operating pressure is below 10 psig. The unit permits straight-through flow in either direction at up to 98-pct full-line flow capacity. It's completely free of internal obstructions, moving parts and cavities which often affect flow and cause service problems. Because only the material moving through the line enters the pinch-valve body, no grease or other contaminent can be injected by the valve. It suits process control, air-veying systems, tank-drain valves or vacuum service. It also works well on the suction side of pumps. (RKL Controls, Inc.)

For more data circle No. 28 on postcard, p. 147



Titan® RC Hex

Titan's new *RC Hex* is free-cutting brass hexagon rod with radius corners.

It offers exciting new advantages when used on screw machines. It is best for making bolts, nuts, hydraulic and automotive fittings, and other parts where the hex serves as a wrenching shape. Here's why:

Superior Points of RC Hex Brass Rod

- Weight-per-foot saving averages ½% over conventional sharp-cornered hex rod. Costs are less.
- Screw machines can take larger rod because of reduced dimension across Titan *RC Hex* rod corners.
- Screw machine operations are quieter and safer because sharp hex corners are rounded.
- Stock tube liners last longer. Machine downtime is reduced because of "rounded" hex bars. "Corner" damage is less. Higher speeds can be used.
- Parts made of Titan *RC Hex* take superior plating because of reduced buildup on corners. Finishing costs less.
- *RC Hex* facilitates assembly of finished parts.
- "Rounded" machined hex pieces don't nick or burr during handling and shipping.
- Finished products made from Titan *RC Hex* have improved "rounded" quality look... added to the natural beauty and strength of being brass.

T.M.

Titan produces *RC Hex* rods in many sizes. Most are from ½" to 2½" across flats. "Special" die sizes are standard at Titan. Let us know your needs.

Consult Mill for *RC Hex* in alloys in addition to Free-Cutting Brass.

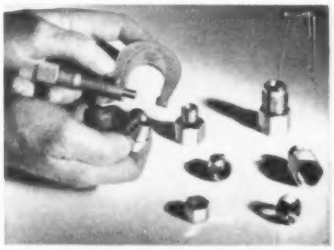
Order Titan *RC Hex* from your nearest Titan Man. Rapid shipments are made to you direct from four Titan brass rod mill depots: Bellefonte, Pa.; Seymour, Conn.; Indianapolis, Ind.; Newark, Calif.



Established 1915

Write for RC Hex die size list and catalog data





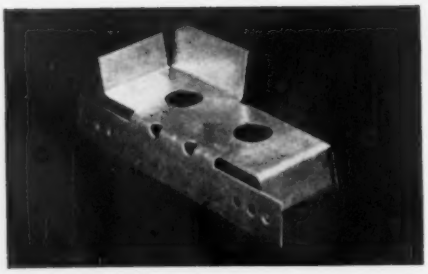
Chrome-plated brass parts machined from Titan RC Hex. Reduced buildup on corners gives superior plating results.

TITAN® METAL MANUFACTURING COMPANY

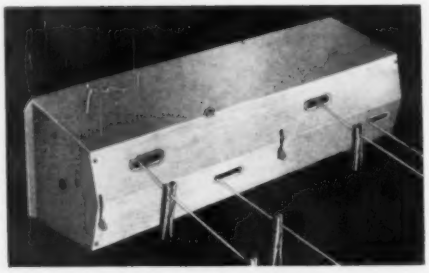
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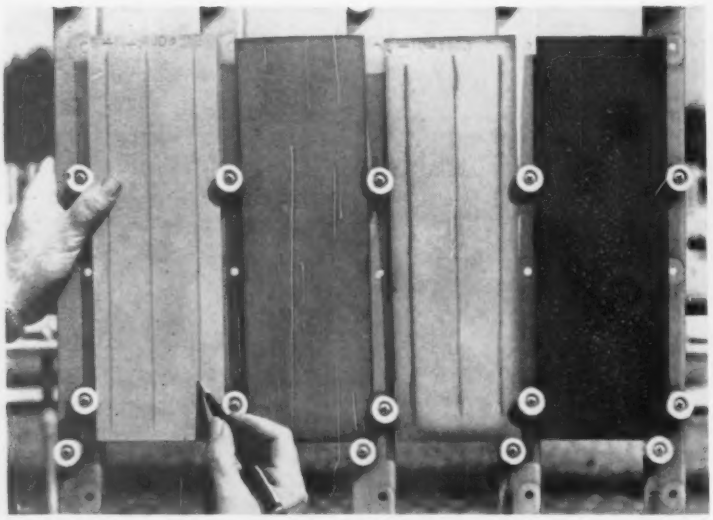


Armco ZINCGRIP Steel



Armco ALUMINIZED STEEL Type 2

5 Armco Coated Steels Can Help





Armco ALUMINIZED STEEL Type 1

Steel

This label identifies modern, dependable steels in your products

After 3-years' exposure outdoors, paint holds tightly to ZINCGRIP A, PAINTGRIP (far left). No rust even where scratched. No rust on the unpainted sample, either (second from left). Samples on the right are phosphate-treated cold-rolled steel, one painted, the other unpainted. Paint has suffered. Rust is evident on the unpainted sample.

1. NEW ARMCO ZINCGRIP® A, PAINTGRIP®. This *new* kind of hot-dip zinc-coated steel is specially prepared to take a paint finish that's every bit as attractive as a paint finish on cold-rolled steel! It's *spangle-free*, holds paint *tighter and longer*, permits *twice as many spot welds* as ordinary galvanized before electrode tips need redressing. It's available *now* in commercial quantities.

2. ARMCO ZINCGRIP STEEL has a tightly adherent zinc coating that gives products durable protection at an *average cost of about 2⅓ cents per square foot*. Savings: About .92 cents per square foot over typical cost of painting. The door part pictured, for example, was previously fabricated from cold-rolled steel, then painted for protection. It is now made of Armco ZINCGRIP at a significant saving.

3. ARMCO ALUMINIZED STEEL Type 1 means greatly increased service life—for mufflers and other consumer, commercial and industrial products menaced by heat and corrosion. Furnace, heater and appliance parts made from this special hot-dip aluminum-coated steel won't discolor to 900 F, won't scale under 1250 F. Reflective parts bounce back up to 80% of radiant heat, remain strong.

New steels are born at Armco

You Fight Costs and Competition

They combat corrosion, solve heat and painting problems.

4. ARMCO ALUMINIZED STEEL Type 2 offers exceptional resistance to outdoor corrosion. In a mild industrial atmosphere, for example, its hot-dip aluminum coating outlasts the coating on unpainted commercial galvanized steel sheets 4-to-1. It reflects heat, too. The manufacturer of the "vanishing clothesline" casing in the photo cites *savings of 30%* in switching from aluminum to Armco ALUMINIZED STEEL Type 2. The reason: ALUMINIZED STEEL permitted reduction in metal thickness without loss of strength. It also assured greater resistance to damage. Ideal for construction products exposed to the weather.

5. ARMCO COLD-ROLLED PAINTGRIP and low painting costs go hand-in-hand. Over a mill-applied electrolytic zinc "flash" goes a paint-holding film. You simply fabricate and paint immediately. Sheets resist rusting in storage, take severe fabrication.

Armco Division
Armco Steel Corporation
1901 Curtis Street, Middletown, Ohio

SEND DATA ON

- ☐ New Armco ZINCGRIP A, PAINTGRIP
- ☐ Armco ALUMINIZED STEEL Type 1
- ☐ Armco Cold-Rolled PAINTGRIP
- ☐ Paint Savings with Armco ZINCGRIP
- ☐ Armco ALUMINIZED STEEL Type 2

Name

Title

Firm

Street

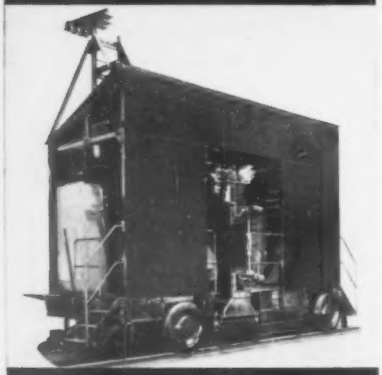
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ARMCO Armco Division



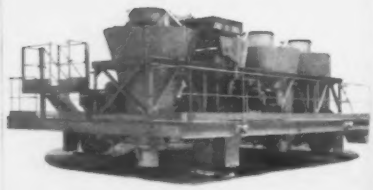
QUENCHER LOCOMOTIVE

COKE ON THE MOVE



DOOR MACHINE

Operating economy and long life, again, are major advantages of Atlas equipment for highly specialized coke-producing service. Specially designed and ruggedly built to your exacting requirements.



COAL LARRY



COKE QUENCHING CAR

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DESIGN DIGEST

Solid, Grooved Pins

Solid, grooved pins can replace hollow pins for fastening electronic-connector, screw-lock assemblies. In



addition to holding the assembly intact, the pins also serve as hand grips for tightening or loosening the screw locks which engage and disengage the connectors. You don't need to hold tight tolerances on the mating part to keep the pins tight. The grooved-pin principle in itself creates the tight fit. When the pin is forced into the drilled hole, the constraining action of the hole wall compresses the pin. This produces a locking fit. (Groov-Pin Corp.)

For more data circle No. 29 on postcard, p. 147

Automatic Clutch

Featuring built-in, forced-draft ventilation for cooler operation, a new automatic clutch suits gasoline and diesel engines from 6-10 hp. For new applications, or for modi-



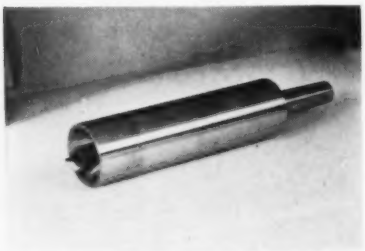
fication of existing installations, there is a wide range of models. These include standard sizes of single- and double-groove sheaves, chain sprockets, timing-belt pulleys and direct-coupling clutches. Other features? Load-free idling, smooth

application and release of load by throttle control only, protection against engine damage or stalling from sudden overloads. (Salsbury Corp.)

For more data circle No. 30 on postcard, p. 147

Self-Centering Tool

Regardless of shape—round, square or rectangular, this tool self-centers stock and center-drills it for machining or grinding. Pressure from a spring forces the tool's outer housing against the stock. This holds it firmly in position. In a lathe, the outer housing rotates with the work, while the inner shaft, holding the center drill, remains fixed. It's locked in the tail stock.



The outer housing rotates on two bearings, a roller in back and a taper-roller bearing that acts as a thrust bearing in front. In a drill press, the tools acts the opposite way. The outer housing is stationary and the shaft rotates. The Raymond Paslawsky Co.)

For more data circle No. 31 on postcard, p. 147

Tubing Valves

Stainless-steel tubing valves suit extreme-temperature service. An elongated stuffing box removes the packing from the hot zone in the valve body itself. The unit gives good service with gas or liquid at temperatures up to 1000°F, and pressures to 30,000 psi. Its two-piece stem doesn't rotate against the seat. This feature eliminates galling or scoring of either the seat or the stem. (Autoclave Engineers, Inc.)

For more data circle No. 32 on postcard, p. 147

Speeds Center Finding

This dial-indicator holder simplifies center finding, and offers greater assurance of precision. Standard adapters permit mounting any indicator. One simple adjustment of the holder's eccentric shank zero's

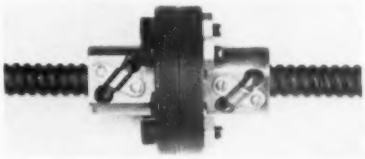


in the dial indicator to the spindle centerline. This setting may be locked and permanently retained. This feature compensates for the characteristic offset of the ball point. Turning a knurled knob adjusts the dial indicator to sweep any diameter. (Edgcomb Engineering & Engraving Co.)

For more data circle No. 33 on postcard, p. 147

No More Backlash

Backlash on these ball-bearing screw assemblies is normally 0.001-0.005 in. How do you get rid of this play? Providing interlocking dog stops on the nut mating faces prevents rotation. A spring washer surrounds the stops and preloads the nuts. In addition to reducing the diameter of the nuts and lowering the cost of the assembly, the new design provides more exact



preloading. The spring washer exerts a constant load, regardless of wear. (Saginaw Steering Gear, div. of General Motors Corp.)

For more data circle No. 34 on postcard, p. 147

Controls Weld Quality

Resistance-welder controls upgrade weld quality and relieve maintenance problems. An extension of an existing system, the new controls use transistor timing and switching circuits to replace the conventional



Fast Shipment FROM WORLD'S LARGEST STOCK of STAINLESS STEEL AN—MS COMMERCIAL BOLTS

SCREWS—Complete range of machine and self tapping with slotted or Phillips recessed heads, both magnetic and non-magnetic.

NUTS—Cap, Hex, Castle, Slotted, Square, Wing, etc.

PINS—dowel, taper, etc. Plus washers, rivets, threaded rod, studs, nails, many more.

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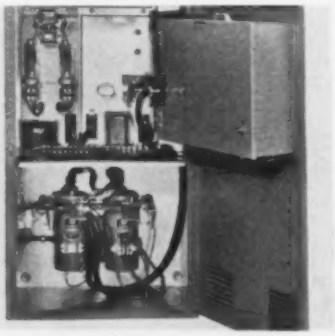
AIRTUBES keep men on the job by delivering quickly *to them* all necessary tools, parts, blueprints, shop orders and other messages.

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Modern LAMSON AIRTUBE SYSTEMS reduce overhead and increase production rates wherever they are used. Be sure you have the up-to-date AIRTUBE story. Send for the new AIRTUBE catalog. Just clip this advertisement to your letterhead and mail to 104 Lamson Street, Syracuse, N. Y.

LAMSON
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thyratron timing tubes and switching relays. Typical uses include automatic-conveying systems, ma-



chine-tool control, numerical control and other jobs where reliability, high speed and long life are important. (Square D Co.)

For more data circle No. 35 on postcard, p. 147

Senses Temperature

Quick make and circuit break is a feature of a new line of compact, bimetal-disk thermostats. They give the rapid response needed in appliances and industrial apparatus. The bimetal sensing disk may be enclosed or exposed, depending on the application involved. Screw, solder, spade, formed or elevated terminals are available. A



variety of mounting provisions, such as flanges or straps can also be supplied. (Stevens Mfg. Co.)

For more data circle No. 36 on postcard, p. 147

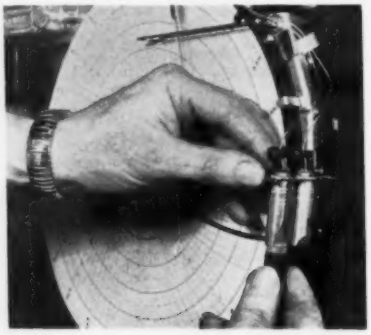
Hydraulic Cylinders

Choice of stroke length is available on a complete line of double-acting hydraulic cylinders. The units come in bore sizes of 1½, 2 and 2½ in., with push capacities of 8, 15 and 25 tons at 10,000 psi. Primarily, they are "push" cylinders; but, they have sufficient "pull" force to return the ram from such work as punching, forming and broaching where spring return is inadequate. A wide range of high-pressure pumps and accessories extend their usefulness. (Precision Hydraulics Div., Owatonna Tool Co.)

For more data circle No. 37 on postcard, p. 147

Meter Marking Device

Substantial savings in service time and costs are possible with a new ink-cartridge, meter-marking device. Three test installations have been operating since the Spring of 1960. Two of them experience high temperatures. One of the units is on a panel board in front of an open-hearth furnace. Here, dust as



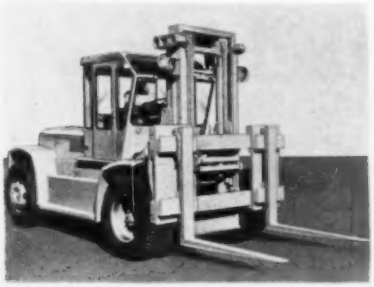
well as heat is a hazard to meter-marking performance. The device uses a capillary system, drawing ink from a disposable cartridge. Each cartridge contains enough ink for several months. Dust, dirt and moisture that cause clogging can't get into the system. (Esterbrook Pen Co.)

For more data circle No. 38 on postcard, p. 147

Fork-Spreader Unit

A hydraulic fork spreader facilitates the handling of irregularly shaped loads weighing 15,000-20,000 lb. The attachment permits combined hydraulic and manual movement of truck forks from 18- to 96-in. wide. Split-fork carriage design makes this possible. Each segment is capable of 24-in., lateral hydraulic movement. In addition to this hydraulic carriage movement, the forks manually adjust 15 in. on each carriage section. Thus, with

the forks in their innermost manual adjustment, the hydraulic spread is 18-66 in.; in the outer position the



spread is 48-96 in. (The Yale & Towne Mfg. Co.)

For more data circle No. 39 on postcard, p. 147

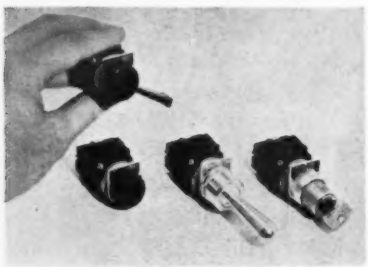
Buffing Attachment

A vertical oscillating attachment, for a line of semi-automatic buffing machines, adapts them to "mush" or "slough" finishing jobs on recessed and contoured components. On large parts, the oscillating stroke permits greater buffing coverage. On small parts, fixtures can be arranged to hold more than one part at a time. This boosts production rates. The attachment is ideal for finishing irregular-shaped die castings, hub-cap wheel spinners, drill motors or any part that has deep impressions, contours and recesses. (Acme Mfg. Co.)

For more data circle No. 40 on postcard, p. 147

Pushbutton Switches

Four new forms add to a line of space-saving, oil-tight pushbuttons. They include (from left to right): Bat-lever selection switch; coin-operated selector switch; wobble-stick



operator; and, cylinder-lock selector switch. Stocking a small number of these components makes many different combinations possible. (General Electric Co.)

For more data circle No. 41 on postcard, p. 147

LAMSON CONVEYORS

when orders come in but can't get out...



LET LAMSON ENGINEERS show you how to speed materials through your plant without adding personnel or enlarging current floor space.

Conveyor units alone are not enough. Units must be moulded into a conveying system designed to accomplish certain objectives. And, system efficiency depends on the expertness of system design.

Only high engineering skill plus long experience in materials handling can guarantee a successful operation. Both characterize the LAMSON record of achievement that goes back 80 odd years.

LAMSON engineers have become famous for providing "Turn Key Jobs" . . . a complete service that includes system design, component installation, user-personnel training, critical operational checks and the assumption of full responsibility.

So . . . if your orders are not hitting the dock on time, check LAMSON. For full information about LAMSON conveying systems, write to 104 Lamson Street, Syracuse, New York.

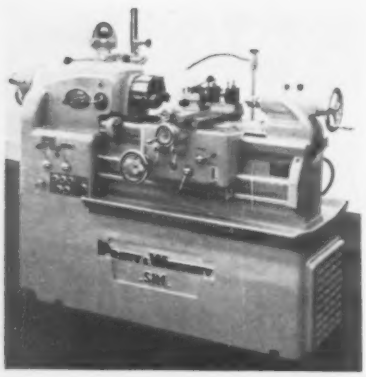
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Manufacturers of Airtube® (Pneumatic Tube Systems) • Integrated Conveying Systems • Pallet Loaders • Selective Vertical Conveyors • Bookveyors® Clinical • Trayveyors® • Food Service Systems • Blowers and Exhausters • Exidust® Central Vacuum Cleaning Systems • Dryset® Air Vacuum Systems

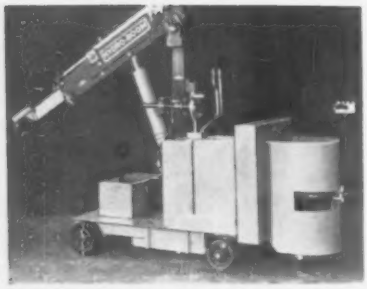
New Equipment and Machinery



Production Lathe Also Excells on Delicate Work

Made for fast metal removal, this powerful 7½-hp lathe is accurate to toolroom tolerances. It produces fine finishes at production-line speed. Heavy cuts, as well as the most delicate cuts on frail work pieces, are within its scope. Another bonus, the new lathe picks up repeat diameters with speed and ease. Thus, economical, efficient operation in small and medium job-lot turning is a reality. Here are some reasons why. For exact cut lengths, micrometer-adjusted, carriage-slide steps trip the power feed to the carriage at any desired location. Quick reversing, with a full range of reverse speeds, allows full use of the rear-tool post—without chatter. (Pratt & Whitney Co., Inc.)

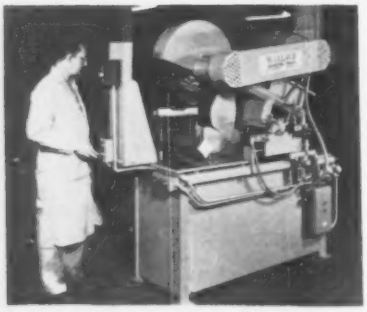
For more data circle No. 50 on postcard, p. 147



Balanced Mobile Floor Crane Halves Labor Costs

A counterbalanced floor crane cuts labor by 50 pct and increases handling capacity. Self-contained and maneuverable, it lifts 3000 lb with the hook four feet beyond the front of the platform. Hydraulic controls guide the boom movement. They give precision movement (0.01 inch.) of the hook in six directions; up-down, in-out and right-left. Heavy loads don't affect precision. You can use the crane in the shop to change dies, molds, grinding wheels, motors etc. (Vanguard Mfg. Co.)

For more data circle No. 51 on postrard, p. 147



Cutting Machine Boasts Power Feed, Oscillation

This particular cutting machine was built for the testing lab of a large abrasive-wheel manufacturer. It works as a straight chop-stroke unit; or, it oscillates from 1-100 strokes per minute. Stroke length varies from ½-6 in. Commercial uses for such a machine are many and varied. It cuts 6-in. diam solid rounds of most steel alloys at about 3 seconds per sq. in. With proper work-holding fixtures, 10-in. channels are easily formed. The cut-surface quality is exceptional. In terms of micro-in. finish, the cutter gives values as low as 32-64. (Wallace Supplies Mfg. Co.)

For more data circle No. 52 on postcard, p. 147



Casting Impregnator Has Durable Heating Units

With electric heating elements as standard equipment, a new casting-impregnation machine comes in packaged form. The assembly consists of a 325-gal autoclave, a 450-gal sealant supply tank and separate hot- and cold-water rinse tanks, each 400-gal capacity. The heating elements are mounted in the sealant supply tank. This eliminates burnt-out elements by preventing contact with settled solids at the bottom of the tank. Remote thermostats control the heating elements. (Prence Mfg. Co.)

For more data circle No. 53 on postcard, p. 147



Morse has an answer to every industrial drive problem under the sun

Basic Drives, Speed Reducers, Couplings, Clutches—only Morse makes all four and only Morse stocks all four. For example, if your industrial drive problem involves basic drives such as roller chain, silent chain, and Hy-Vo® Drives, or "Timing"® belts, friction clutches, and couplings, too, look to Morse for the answer. You'll get impartial engineering help and immediate delivery.

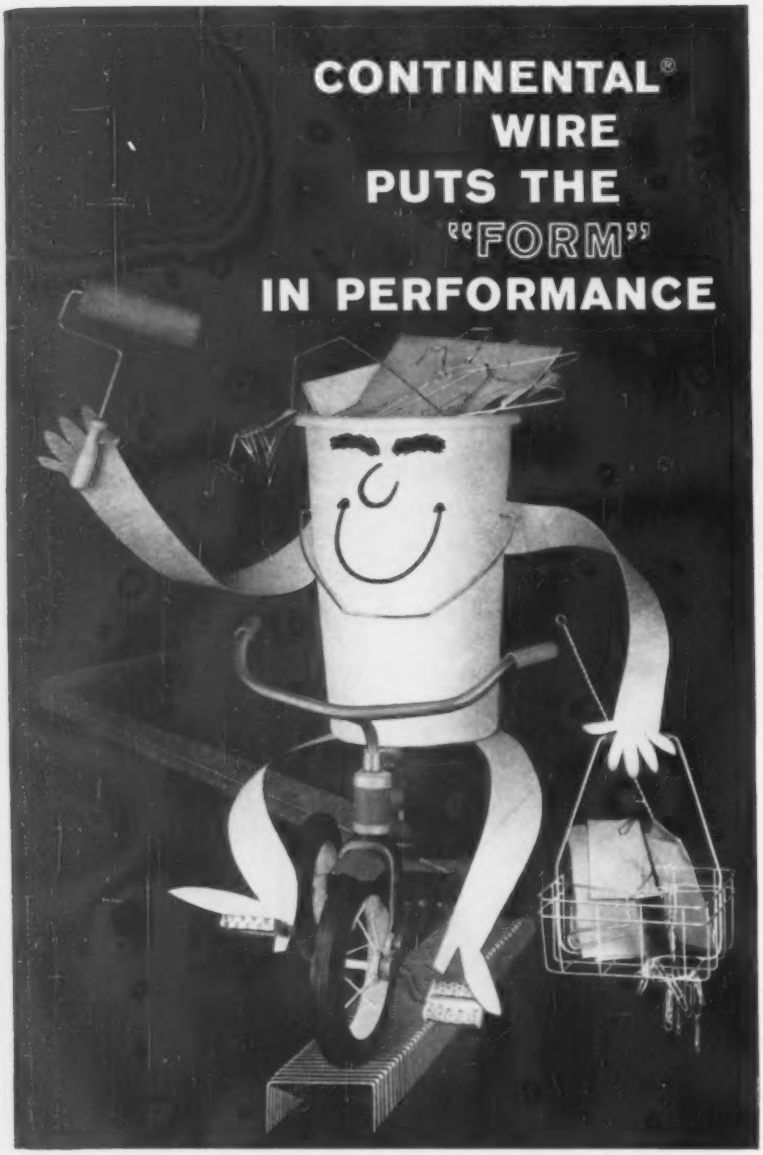


As for quality, Morse products speak for themselves: Morse timing chain is original equipment in over 76% of American cars. So whatever your industrial drive problem, see your Morse man. He's in the Yellow Pages. Or write: Morse Chain Co., Dept. 33-41, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

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Formability that permits difficult twists and bends . . . sustained fast production in coil after coil . . . smooth tight coatings that do not powder, flake or peel to jam machines. Such wire calls for consistent, uniform quality. You can get it at Continental, in sizes and finishes to meet most specifications—from ⅝" on down to 40 gauge, in various tempers and analyses, in low and medium low carbon steels. Special shapes, too. Why not let our mill technicians work with you on any problems you may have pertaining to wire fabrication. We may have the answer to a particular need. Write today for your FREE copy of our new wire manual.

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CONTINENTAL STEEL

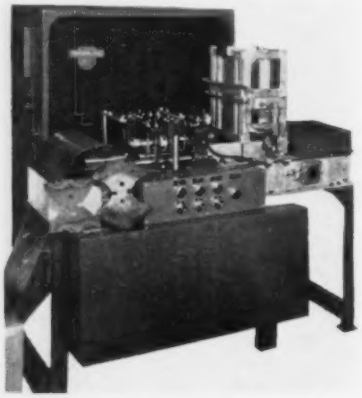
CORPORATION KOKOMO, INDIANA

PRODUCERS OF: Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright and special shaped wire. Also Welded Wire Reinforcing and Galvanized Fabric, Nails, Continental Chain Link Fence, and other products

NEW EQUIPMENT

Anneals Auto Brackets

Until recently, some aspects of the "horse and buggy days" still clung to many aspects of metalworking—



even the manufacture of the "horseless carriage." For instance, annealing steel plates for auto bodies used to be done by torch heat. This meant handling and rehandling the part. Non-uniform heat gave poor results. Now, this task has been automated. An automatic hopper, indexing conveyor and work-coil assembly anneals four plate sections simultaneously. It turns out completely uniform parts. Automatic restocking eases the handling problem. (Induction Heating Corp.)

For more data circle No. 54 on postcard, p. 147

Torch Gives Fast Cuts

A new heavy-duty torch aids high-production metal removal. It meets today's trend toward higher



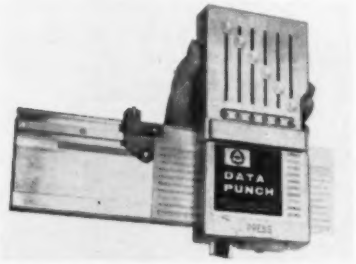
amperages and larger volumes of compressed air for faster metal removal. Although the torch suits any

production job requiring high currents, its primary purpose is pad washing in foundry cleaning rooms. It provides six lines of current through spring - action jaws. A rugged, concentric cable assembly gives the large current and air capacity. High-temperature insulators reduce upkeep cost and increase torch life. (Arcair Co.)

For more data circle No. 55 on postcard, p. 147

Compact Data Punch

As the president of a leading computer user put it: "If you feed an electronic brain garbage, all you get is a bad smell." However, the dietary problems of these computers are being solved with data gathering devices. Here's a valuable unit that "speaks" computer language right from the start. It records data in standard punched-card code directly

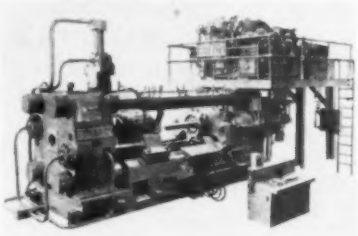


on a tabulating card—at the point of origin. This saves transcription and preparatory steps; eliminates transcription errors. It's useful wherever source data must be gathered at locations other than the data-processing site. (Addressograph-Multigraph Corp.)

For more data circle No. 56 on postcard, p. 147

High-Output Extruder

One week after delivery, a new press extruded up to 5000 lb of aluminum shapes each working hour. The 1650-ton, horizontal machine has electronic servo controls for fully-automatic operation. An auxiliary control panel mounted on the front platen, eases operator control of all press functions. He can reguate extrusion speed while closely observing the emerging work. This feature is particularly important when extruding hollows. Another bonus: Dead-cycle time, including time for spraying the die, is extremely quick. The cycle permits shearing immediately after stripping.

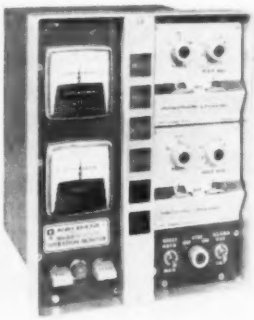


As the main ram returns, the operator sprays the die. (Sutton Engineering Co.)

For more data circle No. 57 on postcard, p. 147

Monitors Machines

In a new application of spectrum analyses, these instruments translate the amplitude and frequencies of signals into normal and off-normal indications. Pickup devices, attached to machines or processes, originate the signals. Panel lamps indicate, and external relays operate, at varying degrees of change from desired operating conditions. Internal logic elements convert selected combinations of these limit signals into normal, alert and alarm relay actions. The instruments have two



data channels, each with two limit levels. Separate transducers excite these channels. (RayData Corp.)

For more data circle No. 58 on postcard, p. 147

Cleans Metal Surfaces

The introduction of a combination steam-cleaning and phosphatizing machine solves a long-standing problem in the preparation of structures for painting. The new machine is useful wherever hand brushing or wiping of metal sur-

A Morse answer



Torque limiters

...when the problem involves automatic overload protection

Protect expensive equipment

Eliminate shear pins

Lessen costly downtime

Adaptable to any drive

Easily adjusted

Controlled torque setting

Capacities: 10 to 6300 ft.-lbs.

Clutch sizes: 3 to 20 inches

Distributor-stocked

Got a clutch problem? Call your Morse distributor. He's listed in the Yellow Pages.

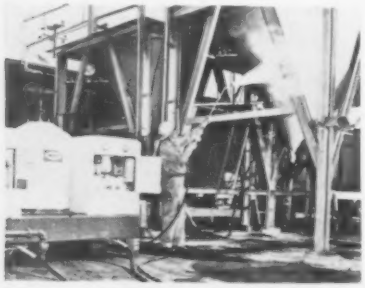
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Morse Chain Co., Dept. 33-41, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

faces is necessary prior to painting. It impinges a chemical, cleaner-phosphatizer solution to provide a



clean surface. The solution also imparts a durable phosphate coating on the surface. This coating protects against rust before painting, acts as a bonding surface for paint, and prevents corrosion under the paint. (Kelite Corp.)

For more data circle No. 59 on postcard, p. 147

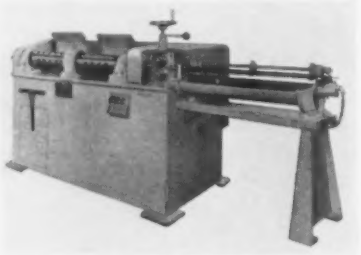
Dry-Film Lubricant

Packaged in an aerosol container, a new dry-film lubricant contains a fluorocarbon dispersion which puts an end to sticking, freezing, galling and abrasion. It's completely inert to nearly all acids, alkalies and solvents. Just as important, it resists oil and water. The slick surface remains through temperatures of −120°F to +500°F. In addition, it's greaseless, doesn't collect dirt or dust and is non-flammable. (Fluoro-Plastics, Inc.)

For more data circle No. 60 on postcard, p. 147

Cuts, Straightens Wire

These machines produce torsion-straightened lengths of wire at high

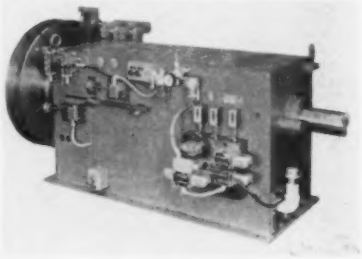


speeds. They boost production of high-tensile wire; handle 19 gage to 3/32-in. diam. For soft basic wire, diameters can range to ⅛ in. Features include two counter-rotating, straightening arbors, mounted on ball bearings. A variable speed unit means you can change the feed rate to suit any application. (Mettler Machine Tool Inc.)

For more data circle No. 61 on postcard, p. 147

Takes Up Wire

With an infinitely-variable traverse lead, a hydraulic, traversing, take-up reel accommodates any wire width within its capacity. The reel operates without the traversing feature for pancake winding of tape, ribbon or strip. The unit consists of a floor-mounted, welded-steel housing, and a spindle whose standard flange will mount a collapsible drum or standard-industrial spool. Enclosed within the housing are the hydraulic pumps and their



supply tank. Valves and all necessary electric controls are outside, for easy access. (The Fenn Mfg. Co.)

For more data circle No. 62 on postcard, p. 147

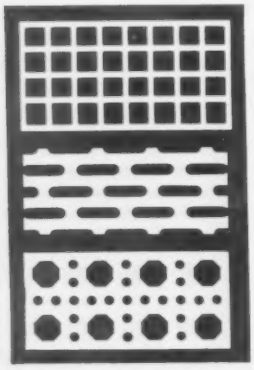
Layout Machine

By directly converting a free-hand sketch into an accurate transparency, a printed-circuit layout machine eliminates the preparation of enlarged-tape layouts and subsequent photographic reductions. Naturally, this saves money. It also drills the resulting etched circuits. (Melpar, Inc. a subsidiary of Westinghouse Air Brake Co.)

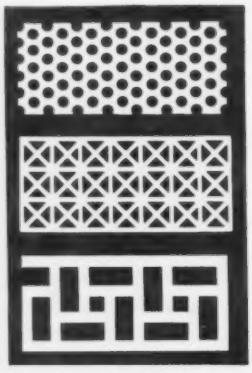
For more data circle No. 63 on postcard, p. 147

Vacuum Furnace

Designed with special emphasis on easy, efficient operation, a new vacuum furnace is versatile enough to handle metallurgical research or



THE MONEY-SAVING ANSWER to Many Production Problems

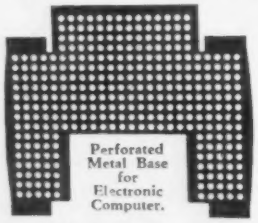


DIAMOND PERFORATED METAL

Sheets • Plates • Panels • Fabricated Parts

For nearly half a century we have supplied America's largest industrial organizations with perforated metal products of all kinds; in lots to meet their production schedules. This procedure not only reduces their inventory costs but, usually, also assures other substantial savings because of our special facilities for producing this type of work efficiently and economically.

Send us YOUR blue prints and specifications. Our experienced engineers are often able to make cost-cutting suggestions without charge or obligation.



We fabricate special panels or parts to any desired extent. Illustrated Catalog on request.

DIAMOND MANUFACTURING CO., WYOMING (Wilkes-Barre Area) PENNA.

production sintering. Forward-looking design provides for future modifications. As an example, the



furnace is exposed on all four sides. Thus, it's possible to conveniently attach auxilliary equipment needed for special studies. The unit operates at up to 4700°F, and at pressures of 1 x 10^{-6} mm Hg. Various combinations of pumping components, power supplies, hot-zone sizes, heating elements and radiation shields are available. As furnace requirements change, new components adapt the furnace to meet these needs. (Abar Corp.)

For more data circle No. 64 on postcard, p. 147

Shop-Recording System

The operation of a new shop-recording system is simple and fast from the standpoint of employees, supervision and management. The units are easily movable and self-contained. They locate in any area of the plant or office—wherever recordings must be made. Input

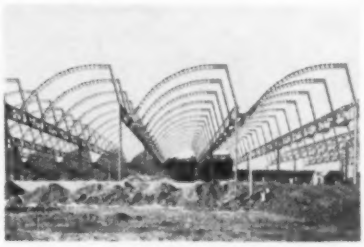


data comes over five sources that cover all activities. Just about anything that happens within a plant can be recorded in a form ready for immediate translation into machine-input language. There's scarcely any human intervention. (The Standard Register Co.)

For more data circle No. 65 on postcard, p. 147

Open-Web Beams

Under construction in Europe, a large manufacturing plant shows the use of open-web beams. They can cut building costs up to 50 pct in some cases. These beams have been known in this country since 1930, but have rarely been used. Hand labor previously necessary for their production offset savings in material. Now, automated machinery that produces the open-web beams is available. Production with the



new machine involves two basic steps: Cutting the profile; and assembly by welding, with or without height-extending spacers. (Waller International Corp.)

For more data circle No. 66 on postcard, p. 147

Cleans Chemicals

A completely automatic, 120-gph steam cleaner has been announced. It heats liquid or powdered chemicals, agitates them in a solution tank and meters them to the desired mixture with steam. Since no chemicals enter the pump or heater coils, the danger of clogging is nil. The unit reaches operating pressure in two minutes from a cold start. (Aeroil Products Co., Inc.)

For more data circle No. 67 on postcard, p. 147

Air Compressors

Major features in a new line of industrial air compressors include individual cylinders, made of nickel-iron alloy with deep radial fins, and suction-valve unloaders. The unloaders hold the intake valves off

A Morse answer



Nylon couplings

. . . when the problem involves corrosion, cost, lubrication

Corrosion-resistant

Cost 20% less

Lubrication-free

Safety first

Easy disassembly

Standard stock sprockets

Fractional to 40-hp. loads

Speeds up to 5,000 rpm.

Distributor-stocked

Got a coupling problem? Call your Morse distributor. He's listed in the Yellow Pages.

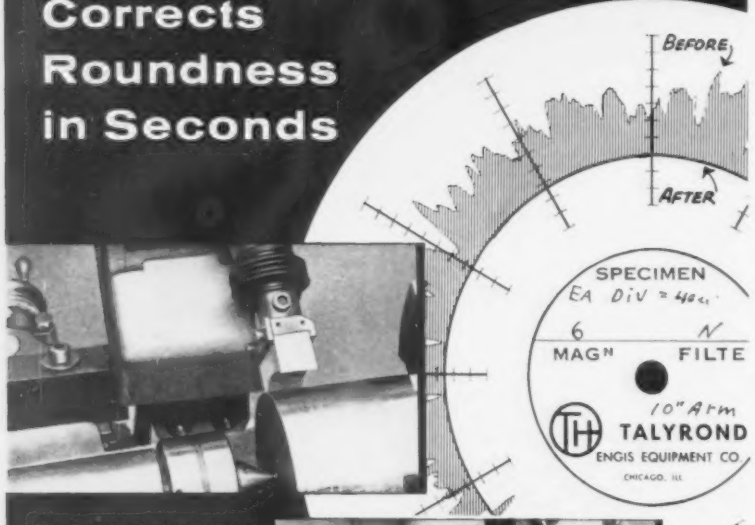
MORSE

A BORG-WARNER INDUSTRY

BW

Morse Chain Co., Dept. 33-41, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

MICROSTONING
Corrects Roundness in Seconds



This Talyrond chart demonstrates the remarkable results from Taft-Peirce Microstoning. Outside trace shows an average roundness of .00028" as ground, inside trace shows roundness improved to an average of .000030", after microstoning! These Taft-Peirce Microstoning heads show where the patented Supfina pneumatic oscillation takes place, driving an abrasive stone at frequency of 1800 to 2000 cycles per minute against a rotating workpiece — achieving desired finish and geometric correction in one operation!

Anyone can get roundness correction if they don't care about time and cost. But, Taft-Peirce Microstoning produces a *controlled* microinch surface finish, removes cutting tool marks, and dramatically improves roundness — all in one simple operation and in a matter of seconds!

You'll find the results in product quality and performance amazing. Shafts and cylinders run quieter, work smoother, won't wear as fast. And you'll find your whole finishing operation is faster, costs less and is easier to operate. All types of metals, hard plastics, and other non-metallic materials can be microstoned.

Try Microstoning on your products! You can use Taft-Peirce/Supfina Microstoners on lathes, boring mills, planers and other machines; or select Centerless Plunge-Cut and Through-Feed Centerless Machines for volume production on small parts. See your nearest Taft-Peirce Agent or send for new Microstoning Catalog No. 319 for detailed information.

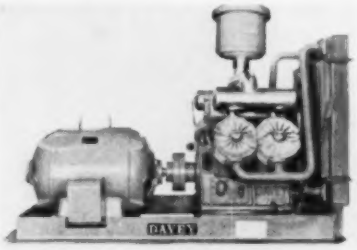
Finish it with

TAFT-PEIRCE *SUPFINA*

TAFT-PEIRCE MANUFACTURING CO. 29 MECHANIC AVENUE, WOONSOCKET, R. I.

NEW EQUIPMENT

their seats when pressure reaches a maximum setting. When pressure drops 10 psi, the valves release, and operate from an adjustable

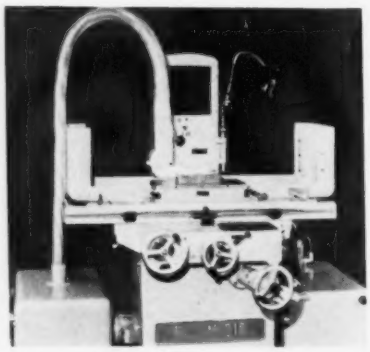


pilot-control valve. Automatic start-stop or dual controls are also available. (Davey Compressor Co.)

For more data circle No. 68 on postcard, p. 147

Surface Grinder

Featuring a table mounted on ball-bearing assemblies, a hand-operated surface grinder has an 8 x 16-in. capacity. A 2-hp motor directly drives its precision spindle. The large down-feed dial is graduated in increments of 0.0002 in. This allows a reading of 0.000020 in. thru a vernier and a fine feed



screw. The machine can be equipped for wet or dry grinding. (Hermes Machine Tool Co.)

For more data circle No. 69 on postcard, p. 147

Gamma Ray Systems

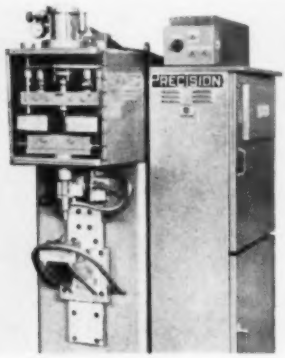
New gamma-ray gaging systems extend a current product line of electronic inspection and control devices for industry. A typical use of gamma-ray gaging is in measuring the thickness and density of pipes, steel plates and laminations

of steel, nickel or other metals. In such operations, rays from a radioisotope source pass through the material. A detector receives and displays the resulting beam. This shows the materials' thickness and density. (Radio Corp. of America)

For more data circle No. 70 on postcard, p. 147

Magnetic-Force Welds

Clean lines, full visibility and easy access to magnetic-system components mark the new models in a line of magnetic-force resistance welders. The units come in 20-, 30-, 50- and 75-kva models. The welders em-

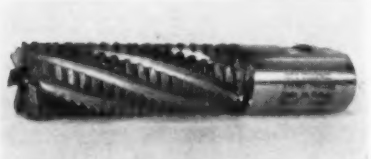


ploy an electromagnet, energized by the weld current, to coordinate weld heat and forging pressure. If desired, a magnetic forge delay is available to further refine weld-force timing. The machines excell with critical materials. Combinations such as silver tungsten to brass, stainless to brass and copper to copper can be welded. (Precision Welder & Flexopress Corp.)

For more data circle No. 71 on postcard, p. 147

Milling Cutter

Boasting fast stock removal on all types of milling machines, a new cutting tool has a distinctive design.

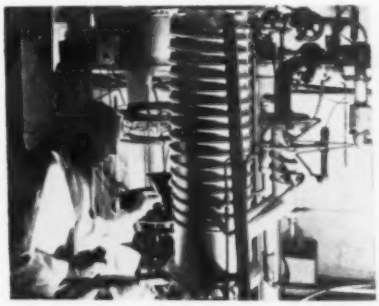


It operates at high speeds and cutting rates. Premium steel and advanced heat-treat methods lengthen cutting-tool life. It runs cool under severe cutting conditions. This helps eliminate flute drag. It also lessons machine vibration. (EDCO Tool Co.)

For more data circle No. 72 on postcard, p. 147

Makes Microcircuits

An integrated vacuum system offers a production medium for the manufacture of complex circuits



composed of thin-film conductors and multiple resistors. It produces thin-film elements that meet standard tolerances and offer high reliability. Customer-training services are available to assist the customer in getting into production in a hurry. (GVC Electron Heating Corp.)

For more data circle No. 73 on postcard, p. 147

Thins Drill Points

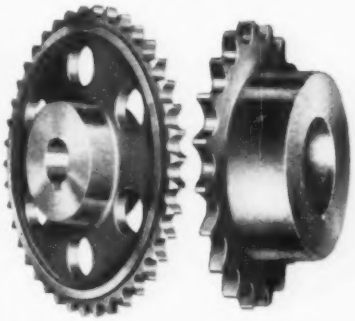
This new drill-point thinning machine is a bench-type, motor-driven unit. It thins and centers the points



of ½- to 3-in. diam drills 24-in. long. In operation, the machine grinds a groove of the proper depth on each side of the drill web. This reduces the length of flat between cutting edges, which tends to thicken as the drill wears. The drill resets for each groove. Thus, its axis is always in the same position. Setting the grinding wheel with relation to the drill axis insures automatic con-



A Morse answer



roller chain

sprockets

. . . when the problem involves quality, cost and performance

Made to A.S.A. standards

Chain-maker quality

Precision pitch control

Controlled concentricity of bore, hub, and teeth

Advanced heat-treating processes

Face runout minimized by exclusive flattening process

Distributor-stocked

Got a sprocket problem? Call your Morse distributor. He's listed in the Yellow Pages.

MORSE

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Morse Chain Co., Dept. 33-41, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

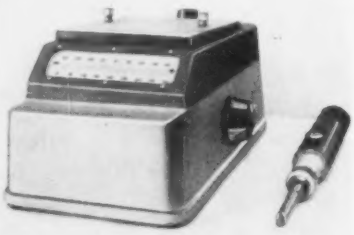
ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

centricity of the web. Micrometer settings control the grinding-wheel height. (Farrel-Birmingham Co., Inc.)

For more data circle No. 74 on postcard, p. 147

Thermoelectric Probe

Metals, alloys and metallic coatings—magnetic or non-magnetic—are detected by means of a simple,



non-destructive test using a thermoelectric probe. The probe "sees" the differences between metals, their alloys and electro-deposited metallic coatings. It separates metal bars or sheets which look exactly alike by simply contacting two points of the metal and noting the thermoelectric power. (Electro Impulse Laboratory, Inc.)

For more data circle No. 75 on postcard, p. 147

Stud Tensioner

For the nuclear power-generating industry, a new machine tensions studs to effect pressure-vessel head closure. The device is essentially a hydraulic jack. It engages 2 to 8-in. stud bolts. Then it applies a straight tensile load that stretches the bolts within their elastic limits. This action has the effect of a weight load in compressing the head closure flanges. With stud and flanges loaded by the tensioner, the head

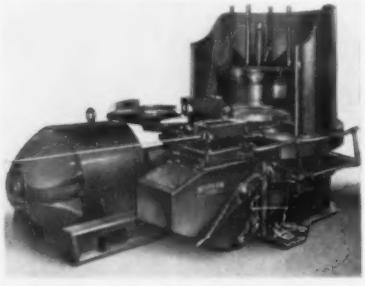


closure nut is manually run down to maintain full loading when the tensioner is disengaged. (Diamond Power Specialty Corp.)

For more data circle No. 76 on postcard, p. 147

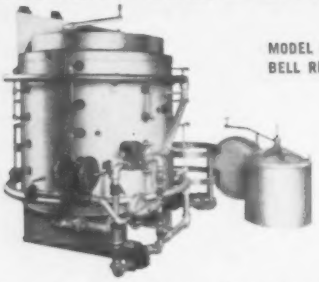
Vertical Wire Blocks

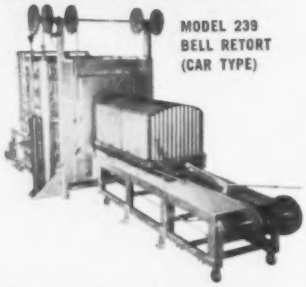
Under development for more than a year, a new line of vertical wire



blocks draw wire faster and at lower cost per bundle. In single or

AGF
BELL RETORT FURNACES





Brazing and Annealing Versatility From 400° to 2150° F

For bright copper brazing, nickel-chromium alloy brazing, bright annealing of stainless alloy, and hydrogen cleaning of small, large or odd shaped pieces, A G F Bell Retort Furnaces provide the reliable and economical answer.

Standard Bell Retorts range in size from 4¾" diameter x 9" high to 40" diameter to 40" high. Special sizes, and Car Type Bell Retort Furnaces are also available.

Write today for further information. Ask for Catalog IA-607.

AMERICAN GAS FURNACE CO. 1004 LAFAYETTE STREET, ELIZABETH, N. J.



HOW KEYSTONE WIRE *adds Sales Appeal* to bobby pins...

To manufacture millions of identical bobby pins, Sta-Rite Ginnie Lou, Inc., Shelbyville, Illinois, needed a high quality spring wire that would perform consistently with long runs in their high-speed automatic wire forming machines.

For extra "sales appeal", Sta-Rite Ginnie Lou specified a wire with superior surface that would take an attractive finish to please discriminating women. It had to have high test flex and maximum spring back qualities. This called for uniform temper and close diameter tolerance throughout the coil.

Keystone Metallurgists, in close cooperation with Sta-Rite Ginnie Lou, developed a white liquor finish, high carbon *completely clean* spring wire with all these qualities. The large coils are specially packed with rust preventive in payoff packs for long trouble-free runs.

Says Vaughn C. Wallace, Vice President in charge of manufacturing, "Keystone Wire, with its superior finish, produces a bobby pin which meets our high standards of quality and ready acceptance in thousands of outlets across the nation." Keystone's excellent wire forming features are the result of accurately controlled thermal treatment and correct chemical analysis to provide the right structure for this difficult cold rolling and forming operation.

Keystone Wire Specialists can produce a wire for your most exacting specifications. Contact your nearest Keystone Wire Representative soon. Or write us concerning your wire problems.

Keystone Steel & Wire Company, Peoria, Illinois



KEYSTONE

WIRE FOR INDUSTRY

MANUFACTURED AT PEORIA, ILLINOIS, U. S. A.



IN METALWORKING, DESIGN IS EVERYBODY'S JOB

Sure, design is a primary function of certain metalworking executives. But its actual importance extends completely across the executive ranks. Decisions on styling, materials, components, and processes frequently involve top company officials and sales managers as well as engineering and production executives.

The May 11 issue of The Iron Age will go a long way toward satisfying management's need to keep up-to-date on the latest and best design ideas from a metalworking point of view. There will be features aimed at the design interests of administrative production, engineering, and purchasing personnel.



The IRON AGE

DESIGN SHOW ISSUE

ISSUE—MAY 11, 1961

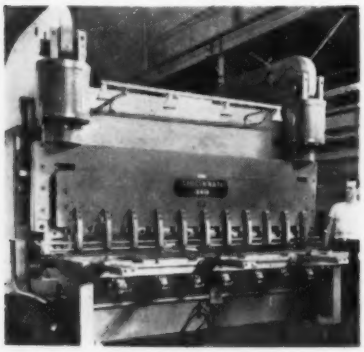
CLOSING—APRIL 28, 1961

double-deck arrangements, the machines come in three basic models, spanning a range of block sizes from 16-42 in. Motor ratings up to 250 hp insure ample power to meet all needs. Optional air or air and water cooling systems attain new levels of cooling efficiency. They take heat out fast, before the wire is affected. This makes it practical to run out really-heavy bundles. (Morgan Construction Co.)

For more data circle No. 77 on postcard, p. 147

Hydraulic Shear

Convenient centralized controls, that adjust the rake and stroke of a hydraulic shear, make for simple efficient operation. Ball transfers in the table facilitate materials handling. To extend the machine's usefulness, a gap frame permits the cutting of plates longer than the



nominal machine length. In addition, electric foot pedals give remote-control operation of the shear. (The Cincinnati Shaper Co.)

For more data circle No. 78 on postcard, p. 147

Rotary Index Machine

Here's a machine tool that drills, countersinks and reams a variety of malleable-iron, automotive door hinges. It does this at a rate of 652



parts per hr, at 100-pct efficiency. The 6-station machine has the left-hand and right-hand hinge of a pair clamped in each work fixture. Each index of the machine means another pair of finished hinges. An unusual feature is a 2-spindle drilling unit mounted underneath the rotary work table at one of the stations. This unit countersinks a hole in the bottom of the hinges. The countersinking tool passes through a bushing detail which supports the hinge. (Snyder Corp.)

For more data circle No. 79 on postcard, p. 147

Places Extrusions

An improved machine for placing refractory castables extrudes the refractory material in a uniform column under pressure. It delivers the material from a sealed mixing chamber to the area of application. For many uses, extruded refractories may be placed faster and with greater density than other applications. In these cases, a better job at a lower cost results from their use. The machine can be used where other methods are practically impossible. (Kaiser Aluminum & Chemical Corp.)

For more data circle No. 80 on postcard, p. 147

Research Aid

Offering a common work coil and two frequencies, a new generator

TO FABRICATE STAINLESS WELD IT WITH AIRCO-MATIC

AIRCOMATIC® welding is the lower cost way to fabricate. Weldments show excellent ductility, tensile, and impact properties. Tailored to the process, Airco's wide range of Aircomatic stainless wires can be used for welding all standard alloy types. Remember: Only Airco makes everything you need for stainless welding.

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FLEXIBLE

NEW, COMPLETE POWERMATIC CATALOG!
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Model 87 20" Metal Cutting Band Saw

DIAL YOUR SPEED AND CUT YOUR COST . . . SAFELY

Set your speed from 10 to 1600 SFM instantly . . . while machine is running!

See how much you save in speed change-over time as you switch from one stock to another instantly . . . ferrous and non-ferrous metals, wood, plastic and similar materials.

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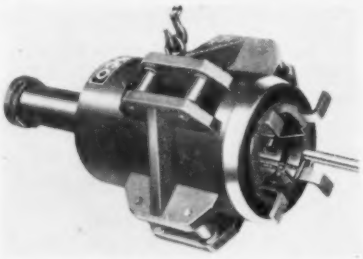
BAND SAWS DRILL PRESSES GRINDERS

provides research personnel with a tool to investigate the effects of frequency on zone refining. Its common, single-turn work coil instantly switches from 300 kilocycles to 7 megacycles. A saturable reactor gives output control. The generator itself rates at 15 kw for continuous duty at either frequency. It will serve in practically any induction-heating process. Proper shielding and arrangement of parts has eliminated any interaction between the output circuits. (Induction Heating Corp.)

For more data circle No. 81 on postcard, p. 147

Hydraulic Tube Pointer

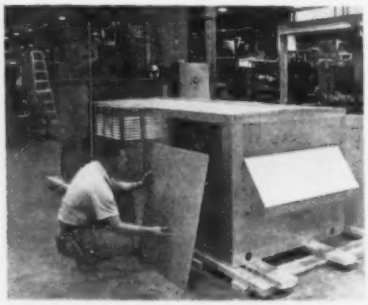
A new hydraulic machine points non-ferrous tube. It reduces the outside diameter of the tube by 30 pct in two seconds. In addition to its speed, the unit is compact, and it offers the advantage of relatively-quiet hydraulic action. It handles tube diameters ranging from ½-2¼ in., without changing pointed segments. Only the radius segments are changed. This takes an average time of two minutes. (Manco Mfg. Co.)



For more data circle No. 82 on postcard, p. 147

Air Conditioner

For commercial or industrial use, a combination air conditioner has a cooling capacity of 75,900 Btu, and a heating output of 160,000 Btu per hr. To ease handling and shipping, the conditioner comes in two units—one for heating and the other for cooling. The heating section consists of two fans on a common shaft, a 1-hp fan motor with a variable-pitch drive, filters, and two 100,000-btuh input duct-type furnaces. An air-cooled condensing unit, evaporator coil and a control box comprise the cooling section. (Westinghouse Electric Corp.)



For more data circle No. 83 on postcard, p. 147

Compressed Air Dryers

Three sizes have been added to a line of compressed-air dryers to bring the total to 40 capacities from 7.5-11,080 cfm at 100 psi. Designed to deliver low-dewpoint air of sterile non-toxic quality, the dryers extract water, vapors, acid fumes and foreign particles. The units operate

Mammoth Wire Rod Mill boasts a production of 25,000 tons monthly.

Kobe Steel, which has led the industry in the production of Wire Rods, has now completed and started operation of a powerful modern mill in addition to the present three mills.

The production of wire rods which now exceeds 65,000 tons is made by integrated process through the most up-to-date wire rod rolling machines.

The Wire Rods of Kobe Steel are made through steel making to rolling under strict inspections on shape, interior structure, etc. and rigid quality control. They conform to every kind of standard such as AISI, SAE, BS, DIN, JIS (Japan Industrial Standard), etc.



KOBE STEEL WORKS, LTD.

Head Office: Kobe, Japan
New York Office: 80 Pine St., New York 5, N.Y., U.S.A.

Piano Wire Rods · Carbon Steel Wire Rods · Alloy Steel Wire Rods · Stainless Steel Wire Rods · Hard Steel Wire Rods · General Mild Steel Wire Rods · In the category of Special Steel Wire Rods · Free Cutting Steel Wire Rods · Bearing Quality Steel Wire Rods · Cold Heading Quality Wire Rods · Arc Welding Electrodes · Other Rolled Steel Products · Machinery

without heat power or regeneration. They have several purposes: Protecting pneumatic tools from corrosion and abrasion; prolonging the life and accuracy of instruments; reducing product spoilage and re-

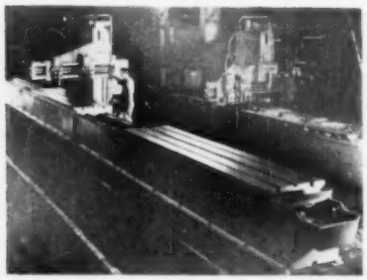


jects; and preventing exposed air lines from freezing. (Van Products Co.)

For more data circle No. 84 on postcard, p. 147

Planer Has Two Heads

An efficient small planer handles fast, double-cut carbide planing. It comes with either single- or double-cutting heads, or any combination of the two. This feature adds versatility, and reduces costly setup and machining time. There's always more than one type of cutting head available. The saddles for rail and side heads are identical for both



single- and double-cutting heads. Thus, either head fits the same saddle. (The G. A. Gray Co.)

For more data circle No. 85 on postcard, p. 147

Inspects Metal Parts

Lighter and smaller than a previous version, a 3000-amp magnetic-particle tester is also fully mobile. It operates on ac or half-wave dc current. Weight is only 600 lb. The machine detects thermal cracks, hot

10 to 15 times longer SERVICE LIFE with...



COWLES Carbide SLITTING KNIVES

● Extraordinary results side trimming tinplate, also side trimming and gang slitting light gauges of high and low carbon steel, silicon, tinplate stock, aluminum, brass, copper and other light gauge materials. Permits slitting and side trimming machines to remain in continuous service for long periods without shut-down for re-grinding. Puts all operations associated with slitting and trimming on a practically continuous, uninterrupted basis, cutting costs and increasing output. Solid carbide or carbide rim in steel hub construction. Furnished in a wide range of sizes to meet any side trimming or gang slitting requirement.

Write for New Bulletin No. 601 Today!

Ask us also about COWLES

Max-Cut; Specialloy; Superalloy; Circle C and Super C Slitting and Side Trimming Knives.

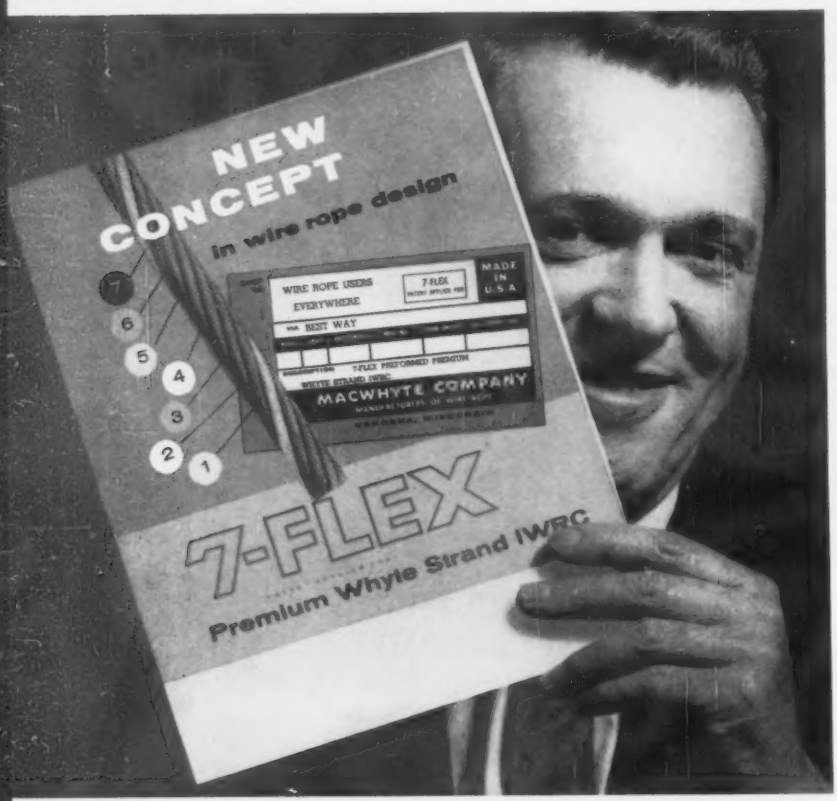
Spacers
Edging Rolls
Forming Rolls
Chuck Jaws
Scarfing Tools
Roll Turning Tools
Carbide Tipped Scrap Chopper Blades
Rotary Cut-off Knives

These tools illustrated and fully described in Catalog No. 561 Write for your copy Today!



COWLES TOOL COMPANY

2086 WEST 110th STREET • CLEVELAND 2, OHIO



BIGGEST NEWS
in wire rope in years!

Macwhyte's new 7-FLEX is sure to change your thinking about wire rope!

There's absolutely no other wire rope like 7-FLEX! It's an *all-purpose* rope, as flexible as 8-strand — as rugged as 6 x 19 — as fatigue-resistant as 6 x 37.

7-FLEX has 16⅔% more wearing surface than 6-strand rope. There is less unit pressure between rope and sheaves, so less rope and sheave wear. There is more sheave contact, less rope-creep. Result: longer rope life, less downtime, lower operating costs!

You owe it to your company to learn more about 7-FLEX. Ask any Macwhyte distributor. Free bulletin 60100-R on request.

Other Macwhyte products that serve you profitably



Corrosion-Resisting Wire Rope — Many sizes and constructions in Stainless Steel, Monel Metal and plastic or nylon coated. Meet the requirements imposed by alkaline and acid conditions and marine atmospheres, temperatures, and humidity. Send for Bulletin 49-30.



Slings — Safe, easy-to-handle Macwhyte slings for every lifting need are available in round-braided, flat-braided, or Safe-Guard styles. Many standard designs. Also custom-made to your requirements. Send for Bulletins 5308-R and 5886.



Wire Rope Assemblies — Safe-Lock wire rope assemblies are precision made to your order in the size, length, and strength needed. Uniform high quality with fittings permanently swaged to the rope. Many standard designs. Send for Catalog 6101.

THE RIGHT MACWHYTE

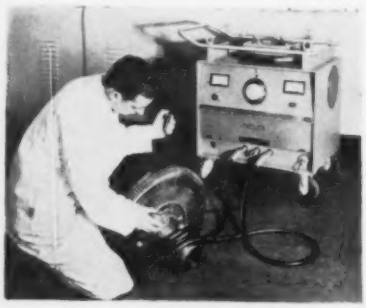
MACWHYTE
Wire Rope COMPANY

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Wire Rope Manufacturing Specialists Since 1896

243

tears and shrinkage in castings. It also spots thermal and crater cracks and lack of fusion and penetration



in welds. One man rolls it into tight corners. Thus it's practical in many plants where space limitations previously prohibited magnetic-particle inspection. (Picker X-Ray Corp.)

For more data circle No. 86 on postcard, p. 147

Spray Builder at Work

Shooting color-impregnated structural fiberglass with this new spray gun is an efficient way to improve a



concrete wall. One hour after this wall has been "shot," it will sparkle with new color and beauty and be permanently maintenance free. Powered by a number of different equipment packages, the gun suits a wide range of capacities and investments. The fiberglassing unit builds most items at lower cost than slow hand-layup methods of fiberglass construction. (Spray-Bilt, Inc.)

For more data circle No. 87 on postcard, p. 147

Compact Torque Reels

Modified reels enlarge a balancer torque-reel line. The new units come in three sizes for balancing

5-, 10- or 15-lb loads such as metal-strapping tools, powered staplers and electric tools. An instant automatic-release lock engages at any desired cable length. This relieves spring tension and allows the load free movement. Less than ½-in. pull instantly releases the lock. Then

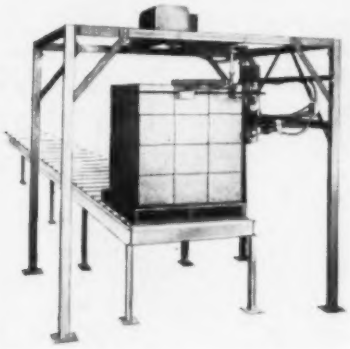


the cable retracts to its rest position. When the lock is released, the unit becomes a conventional balancer. (Aero-Motive Mfg. Co.)

For more data circle No. 88 on postcard, p. 147

Low-Cost Taper

An automatic load taper boasts compatibility with any automatic- or manual-pallet loading system. It automatically applies a strip of pressure tape, in any width from ¼-1½ in. Positive taping is assured each time by a spring-loaded follower roller which applies constant pressure to the tape. This roller follows the tape around the carton pushing it against the carton. The tape is

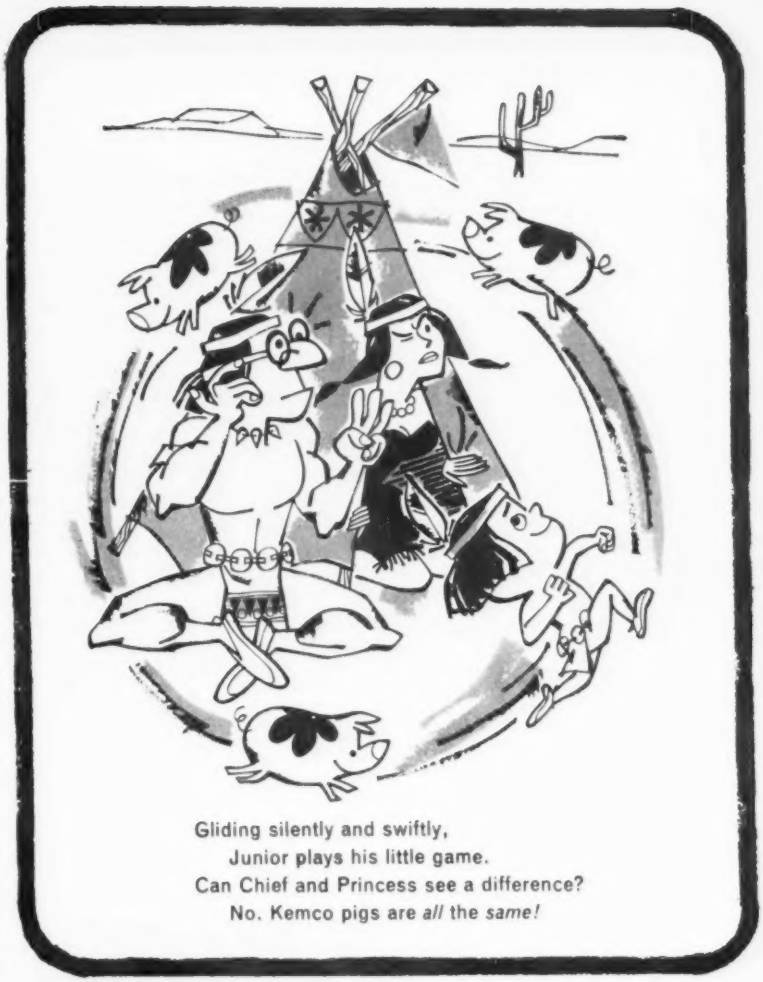


then overlapped, cut and clamped automatically. This completes the cycle. (The Lathrop Paulson Co.)

For more data circle No. 89 on postcard, p. 147

Processes Gases

Impingement-plate scrubbers wet clean, absorb or cool a wide range of industrial gases. The units pro-



Gliding silently and swiftly,
Junior plays his little game.
Can Chief and Princess see a difference?
No. Kemco pigs are *all* the *same!*

When you think of SILICON . . . think of KEMCO!

KEMCO SILVERY PIG IRON

SILICON METAL—OTHER FERROALLOYS



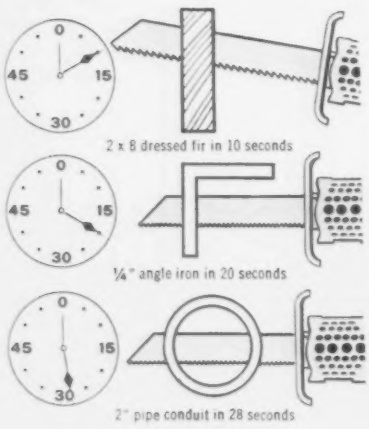
Pig for pig, car for car,
Kemco uniformity *never* varies—
result—a consistently uniform melt.

Keokuk Electro-Metals CO.
Division of Vanadium Corporation of America
Keokuk, Iowa • Wenatchee, Washington

Sales Agent: Miller and Company
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St. Louis 5, Missouri, 8230 Forsyth Blvd.

The superior form of silicon introduction . . . available in 60 and 30 lb. pigs and 12½ lb. piglets . . . In regular analysis or alloyed with other elements. For uniform high purity, aluminum producers specify Kemco Silicon Metal.

New B&D Sabre Saw cuts through all material in less time ...with spunk to spare



Wood and metal turn to butter faster ... with the new B&D power-packed Sabre Saw. Tests prove it cuts through 2x8 dressed fir, ¼-inch angle iron and 2-inch pipe conduit all in less than a minute ... almost twice as fast as any saw its size! Greater power, new long-stroke action (cutting surface is over 1") make the difference, put more teeth into every job (assure less blade wear).

Wider range of blades, too ... for all-purpose performance

Choose from a complete new line of Sabre Saw blades—double-edged for pockets and scrolls, single-edged for any job. They fit all other leading saws, too ... make them cut faster. Buy the new B&D Sabre Saw with five all-purpose blades at leading distributors everywhere.

Black & Decker
CUTS MAN-HOURS TO MINUTES

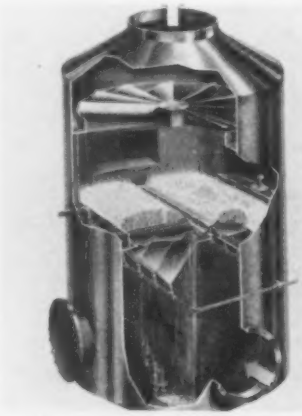
THE BLACK & DECKER MFG. CO.
Towson 4, Maryland 0904
(In Canada: Brockville, Ont.)

☐ Please arrange a demonstration of B&D Sabre Saw.
☐ Please send additional information on B&D Sabre Saw.

Name.....Title.....
Company.....
Address.....
City.....Zone....State.....

NEW EQUIPMENT

vide a highly-efficient scrubbing action with low operating and upkeep costs. Both single and multiple impingement-plate units are available. The single-stage scrubber handles dust loadings of up to 100 grains per cu ft. It removes suspended particles that range from sub-micron fumes to dust particles

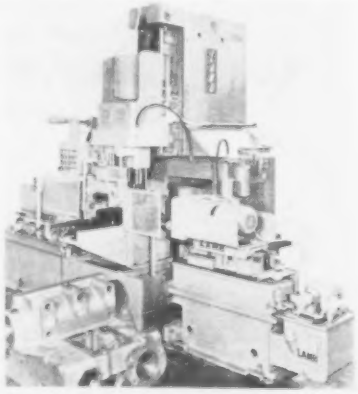


in the larger micron sizes. Efficiency exceeds 99 pct on many types of dust. (The W. W. Sly Mfg. Co.)

For more data circle No. 90 on postcard, p. 147

Drilling Machine

One vertical and three horizontal-way units drill, chamfer, spotface and form valve seats in tractor power-lift housings. The new machine features a tunnel-type vertical column. It straddles one of the horizontal-slide units. This eliminates the need for an additional machine

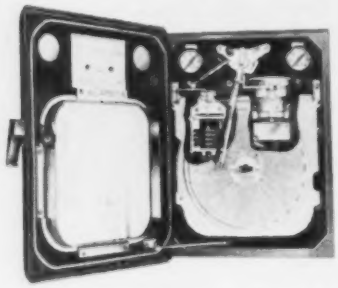


to spotface and chamfer one hole in the part. The machine is essentially a combination of standard building blocks. Therefore, quick conversion presents no problems. Just substitute controls or components. (F. Jos. Lamb Co.)

For more data circle No. 91 on postcard, p. 147

Recording Controller

Key to the performance characteristics of a recording pneumatic controller is its special control unit. The case of this unit is die-cast aluminum with working parts of stainless steel. Construction of this position-balance unit has been kept simple, making it rugged and easy to maintain. The controller gives good frequency response (essentially flat to over 300 cycles per minute). Exhaust capacity is well over 3 scfm

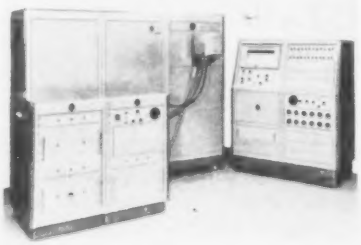


at 1-psi pressure drop. High shock tolerance and temperature stability can also be expected. (The Bristol Co.)

For more data circle No. 92 on postcard, p. 147

Fast Chemical Analysis

Combining a spectrometer with a spark source and recording console yields a quantometer for production control. The laboratory in-



stallation provides accurate, precise and rapid chemical analysis of nearly every material used in industry. The assembly presents the concentration of each element to the



The saw that could cut a house in half!

New B&D Sabre Saw with longer cut goes through wood, metal, plaster

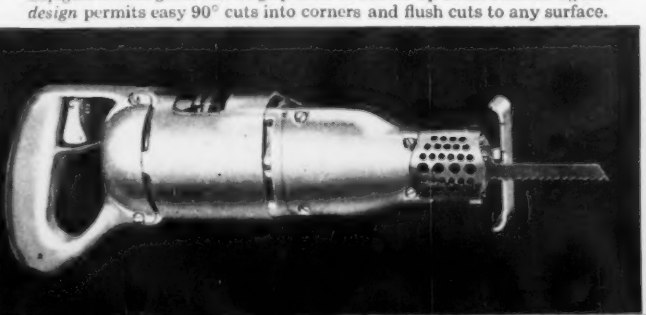
It stops at nothing! The new Black & Decker Sabre Saw power-cuts clean through wood and plaster, metal pipe and sheet . . . all as easy as you please with exclusive long-stroke action. Unique rock 'n' lock shoe design makes your work easier yet. Blade spindle turns 90° and 180° to cut in any corner, cut out any pocket. You grip right behind the safeguard blade guide for up-front control. You'll find the Sabre Saw's vibration is the lowest ever . . . its balance perfect for the most accurate cutting. Just try the new B&D Sabre Saw one time . . . and you'll see how it *could* cut a building in two, any time.

For sales and service, look in the Yellow Pages of the telephone book under TOOLS ELECTRIC

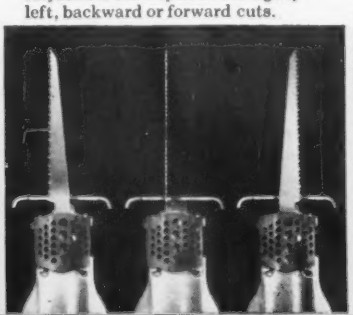
Black & Decker®

CUTS MAN-HOURS TO MINUTES

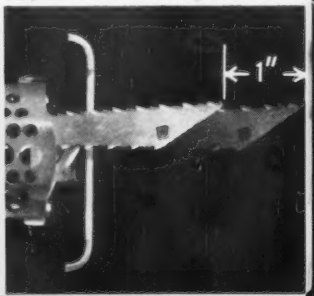
Safeguard blade guide allows grip close to cut for up-front control. *Offset-design* permits easy 90° cuts into corners and flush cuts to any surface.



Adjustable blade spindle for right, left, backward or forward cuts.



Long-stroke action provides a cleaner cut, faster work and longer blade life.

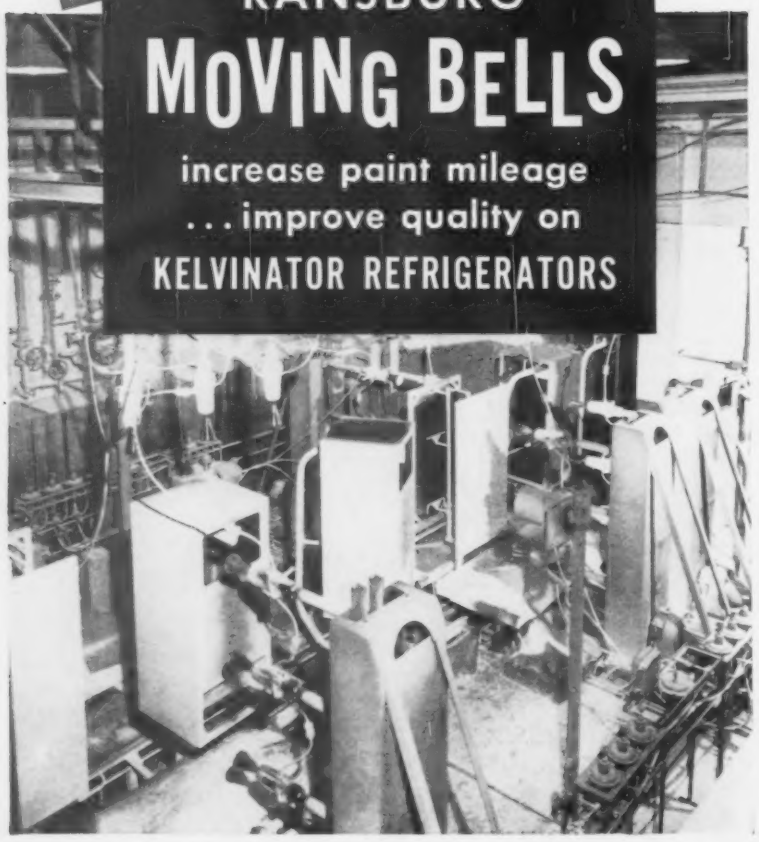


NEW

RANSBURG

MOVING BELLS

increase paint mileage
. . . improve quality on
KELVINATOR REFRIGERATORS



Ransburg's No. 2 Process moving bells—latest innovation in electrostatic painting—automatically paint mixed sizes of refrigerator cabinets and doors on Kelvinator's new finishing line.

On this job—first of its kind—limit switches re-position the reciprocating bells to accommodate various model sizes mixed on the same line. And, electric eyes selectively trigger the paint on and off between parts.

RESULTS? Automatic electrostatic spray painting—which replaced a battery of reciprocating automatic air guns—is providing Kelvinator with a beautiful, higher quality, and more uniform finish. Rejects, formerly a troublesome problem, have been practically eliminated. And, along with appreciable labor savings in this highly automated set-up, paint mileage is substantially improved . . . even bettering the savings indicated in pre-installation lab tests at Ransburg.

Like Kelvinator, other manufacturers of quality products will find Ransburg's moving bells the automation answer for production lines where batching of similar parts is impractical.

NO REASON WHY YOU CAN'T DO IT, TOO!

Want to know how Ransburg No. 2 Process can improve the quality of YOUR painted products—and at the same time—cut YOUR paint and labor costs? Write for our No. 2 Process brochure. Or, if your production doesn't justify automatic painting, let us tell you about the No. 2 Process Electrostatic Hand Gun which can be used in either conveyorized, or non-conveyorized painting.

RANSBURG



RANSBURG Electro-Coating Corp.

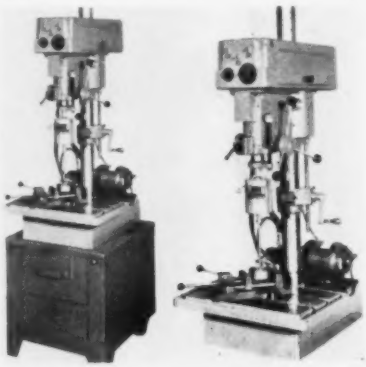
Box 23122, Indianapolis 23, Indiana

operator on a permanent record every 2.4 seconds, after a 20-second sparking of the sample. Up to 48 elements can be analyzed simultaneously. (Applied Research Laboratories, Inc.)

For more data circle No. 93 on postcard, p. 147

Removes Broken Taps

A combination bench and floor model metal-disintegrating machine removes broken taps, dies and reamers from machined parts, castings and dies. It's completely self contained. You don't need a drill press to hold the operating head. The machine has a 14 x 22-in. "T"-slotted table and a 6-in. gravity



feed. If castings are too large for the work table, the head can be removed and chucked into a radial drill. A ¼-20 tap usually requires about one or two minutes to burn out. There's no damage to the threads in the hole. (Jiffy Tool Supply Co., Inc.)

For more data circle No. 94 on postcard, p. 147

Dewpoint Control

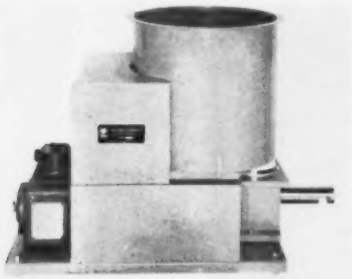
With a new endothermic generator, the rule is full-rated generator output in the minus-dewpoint range. This performance should benefit metallurgists and production men dealing with complex heat-treating and sintering problems. New silicon-carbide heating elements permit operation up to 2000°F. This assures complete heat penetration of the retort, even at full-rated capacity. Also, the constant resistance of

the ceramic elements eliminates the need for expensive tap transformers. (C. I. Hayes, Inc.)

For more data circle No. 95 on postcard, p. 147

Dry-Materials Feeder

A new solid-materials feeder combines the positive hopper action of the live bin with the metering



accuracy of a rotating screw. The feeder maintains a metering accuracy better than 1 pct. It hoppers all dry materials without bridging or flooding. Design is rugged, compact and simple. All contact parts come out easily for cleaning and washing. A variable-speed transmission supplies an accurate drive with a 10:1 speed range. (Vibra Screw Feeders, Inc.)

For more data circle No. 96 on postcard, p. 147

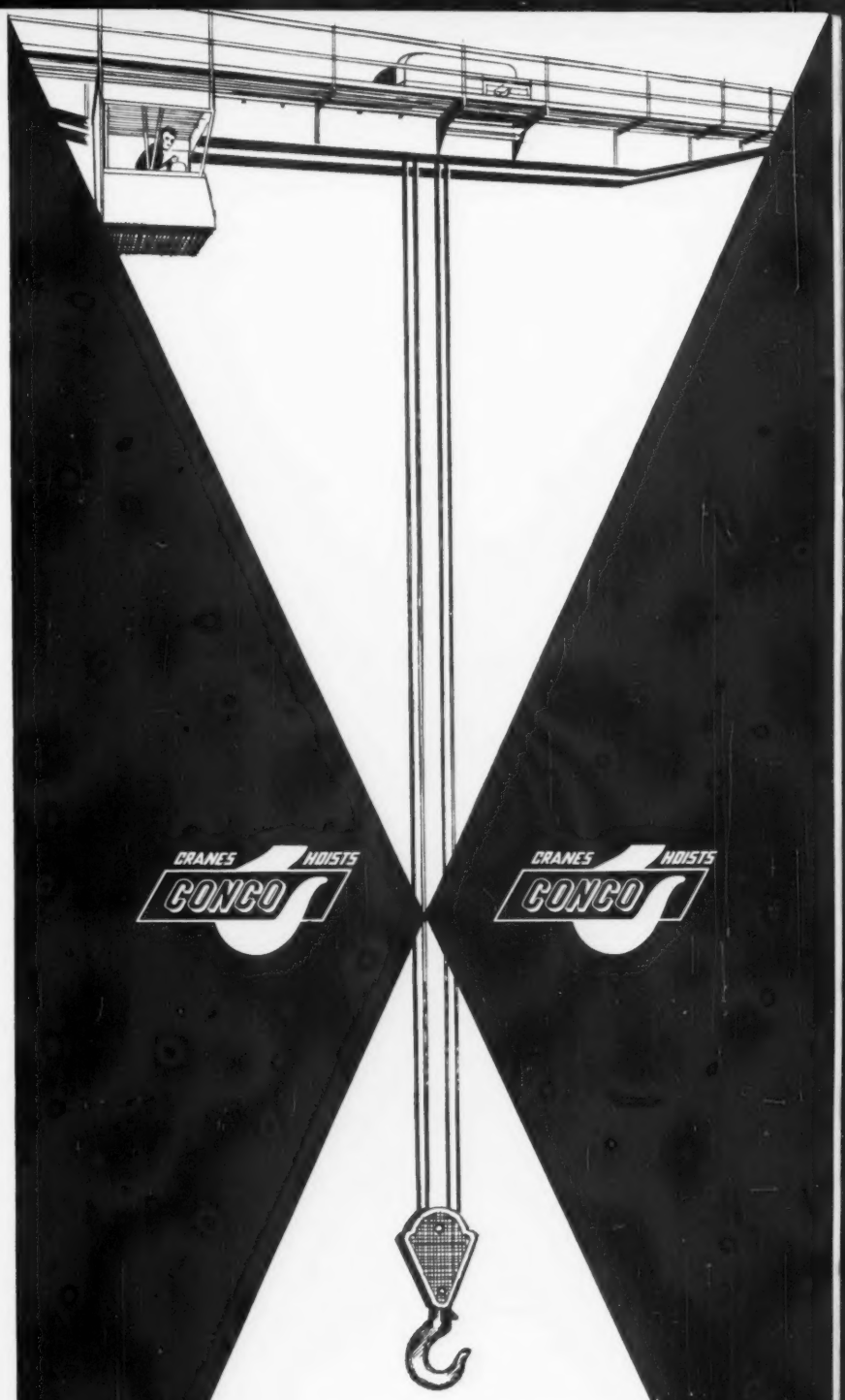
Grinds at Both Ends

This double-end internal grinder upgrades accuracy and surface finish on workparts such as diesel nozzles. The advanced machine grinds a straight and a tapered bore at a single chucking of the workpiece.



Operation is completely automatic. The operator needs only to load and unload. (Bryant Chucking Grinder Co.)

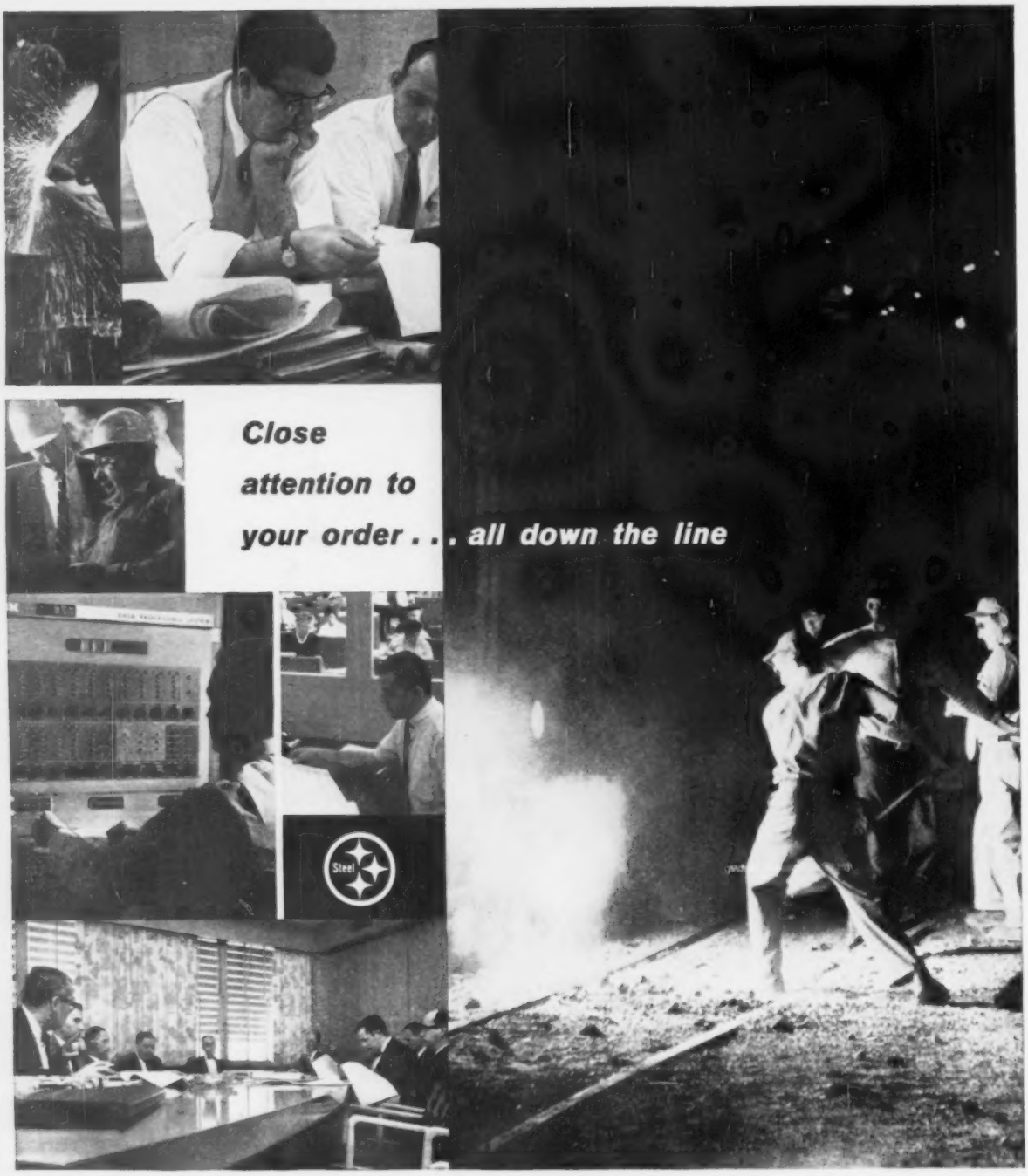
For more data circle No. 97 on postcard, p. 147



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Overhead Electric Traveling
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Alan Wood is just the right size to give your order and requirements the close attention of Alan Wood's skilled steel-men . . . all down the line. You get the advantage of young creative thinking tempered by 135 years of solid experience. Alan Wood's fully integrated operation cuts red tape, gives you uniform quality in plate, sheet and strip . . . consistently . . . and ON TIME.

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Real Buoyancy in Steel Demand

There are some solid facts to be found in the present upturn in the demand for steel that are hard to ignore.

And some other factors show promise and potential.

■ Demand for steel seems to have taken on real buoyancy for the first time in the upturn. And, if this situation continues, the come-back in steel operations could begin to feed on itself, further adding to the pickup.

So far, gains are more apparent in statistics than in comments from steel executives. Sheet and strip orders, highlighted by galvanized and tinplate, provide encouragement. To a more limited extent, so do structurals. But bars, wire and other heavy steels are either spotty or responding sluggishly to the upturn. And sales executives are discouraging bullish talk.

Impressive Facts — But these facts on the overall situation are impressive:

1. Orders for April shipments are running 10 pct over the comparable March position for some mills. Because of fewer shipping days, the total gain is expected to be less than 10 pct, however.

2. May orders for some mills are 10 pct or more ahead of the April position.

3. Rate of order intake has been above 60 pct for four weeks now. Order flow is described as more solid than ever before.

4 Steel operations moved over 59 pct last week, based on the 1960 capacity.

Fewer Cutbacks — Some other factors are largely a matter of promise and potential. But they will undoubtedly have their effect on the market.

A large Midwest mill notes, for example, that instead of orders being cut back as in previous months, it has received no cutbacks or cancellations in April. And this month looks as though it will be the best so far in 1961.

Steel service centers are watching mill sheet delivery schedules closely. They don't want to be caught short in the event there is a stretchout in delivery promises. Some have already stepped up their buying rate. Others have dropped long-term inventory reduction plans.

Delivery Pinch? — Rush orders, particularly from miscellaneous users, continue to increase. This indicates a relatively weak inventory position. Gains in warehouse purchases, plus rush orders from automakers, could push small customers back a couple of days on mill schedules.

Oil producers provide another example of the dangerously low level of inventories. They say they will order 30 pct to 60 pct more pipe this year than last to drill the same number of wells. Both jobbers and producers admit they have cleaned out inventories.

Even without any significant increase in actual steel usage, steelmaking operations could reflect higher operating rates as more and more customers feel the pinch of delivery delays.

All this does not mean an upturn of boom proportions, however. There is still nothing ahead to indicate more than a gradual pickup and a summer letdown is still a possibility. But the general outlook is for a gradual improvement in business, at a better rate than seemed to be indicated a few weeks ago.

District Steel Production Index 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	103	100	89	116
Buffalo	88	80	66	129
Pittsburgh	86	82	79	118
Youngstown	70	65	71	111
Cleveland	91	90	70	152
Detroit	106	104	92	77
Chicago	96	96	94	130
Cincinnati	87	89	87	142
St. Louis	112	110	104	108
Southern	102	100	100	113
Western	113	103	108	112
U. S. Index	93.8	91.0	86.5	119.4

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	1,748	1,696	23,402	39,292
Ingot Index				
(1957-59=100)	93.8	91.0	83.7	140.6
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$37.83	$39.17	$38.50	$33.50
No. 2 bundles	$25.83	$27.17	$27.83	$22.83

A Good Year for Electronics?

Producers of electrical equipment disagree on the sales outlook for 1961. Some look for new records; others aren't optimistic.

Reason: Much depends on Federal spending in the defense program. Many feel it's still uncertain.

▪ When The IRON AGE surveyed producers of electrical and electronic equipment and controls in the beginning of the year, it found them with varying feelings on profits but in relative agreement on sales for 1961.

Now manufacturers disagree on the sales outlook, too.

Reason: Government has boosted contracts for missile armament, controls, and computers for weapons systems. Defense programs could be the controlling factor for some computer makers in the second half. In fact, some companies already report that government contracts are responsible for more than half of the present backlog.

Soft Prices—Industry sources indicate prices of electrical products were soft in 1960. Generally, they are not expected to continue this trend throughout this year. They may hold at present levels; may strengthen somewhat.

But, in some cases, better production methods and higher volume at major companies have led to reduced prices. This is particularly true in the case of such items as capacitors, transistors and rectifiers. This is good news to many buyers such as the auto industry.

Automakers spent an estimated $5.65 million for transistors and other semi-conductors last year. There are some reports that this outlay will nearly double in 1961. It could reach close to the $50 million level by 1962.

Shipments—But there will probably be ups and downs for factory shipments of electrical products this year, according to the National Electrical Manufacturers' Assn.

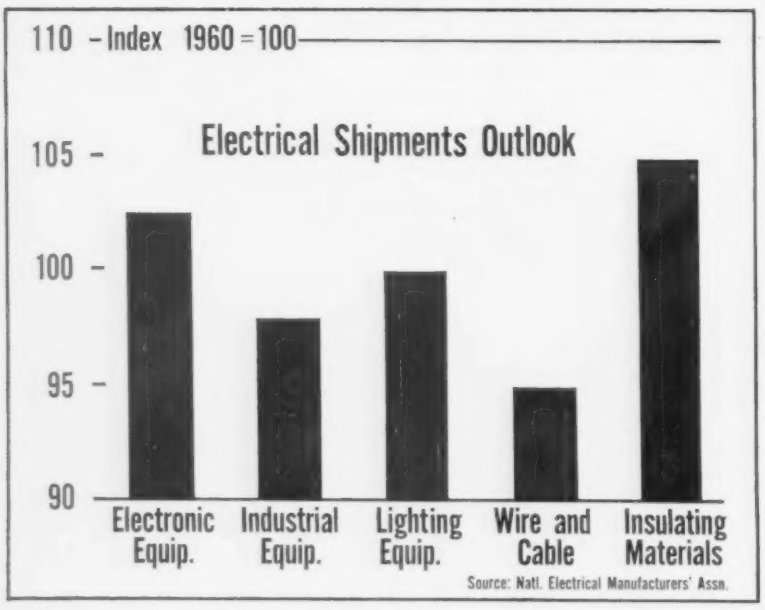
NEMA forecasts a 2.5 pct rise in shipments of industrial electronics this year (see chart). It looks for a 2 pct drop in industrial equipment; a 3.5 pct decline in generation, transmission and distribution equipment for utilities; no change in lighting equipment; a 5 pct drop in wire and cable shipments; a 2 pct drop in building equipment; and a 5 pct rise in shipments of insulating materials.

The association says a record $22.6 billion worth of electrical equipment was shipped last year. This was 5 pct higher than 1959's shipments totaling $21.5 billion. The previous record of $21.9 billion was set in 1956. Now, some producers say, 1961's shipments could surpass last year.

The Markets—The strong market is presently the turbine field. However, major appliances are also looking stronger. One manufacturer of electrical motors and generators says first quarter sales were 10 pct higher than the fourth quarter. The second quarter, according to this producer, should jump 10 pct.

In the area of marketing, one large electrical company plans to whet customer interest with a series of educational kits. The kits are to be used in teaching the basic principles of electronics. They will allow the buyer to assemble transistor radios and even a small analog computer.

It's a Varying 1961 Forecast



RITCO FORGED

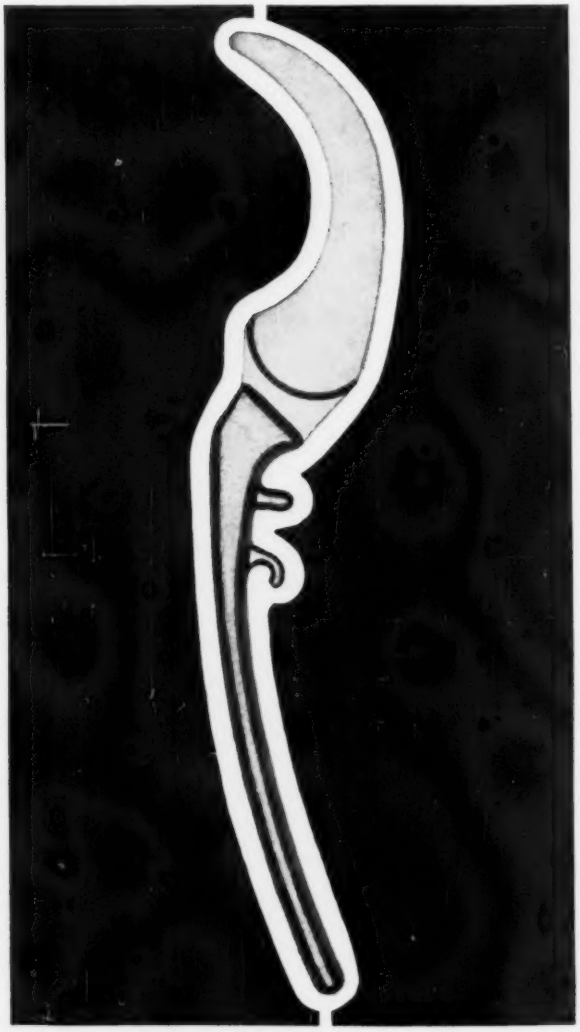
uniform accuracy saves costly machining

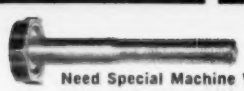
True to your blueprint and smoothly finished, Ritco Forgings require little or no machining and can be assembled readily with minimum fitting. Combined with these advantages, their forged-in toughness and great strength make them ideal parts for quality products. It will pay you to know more about Ritco "Bright Finish" Forgings. Send us your drawings and specifications for estimates.

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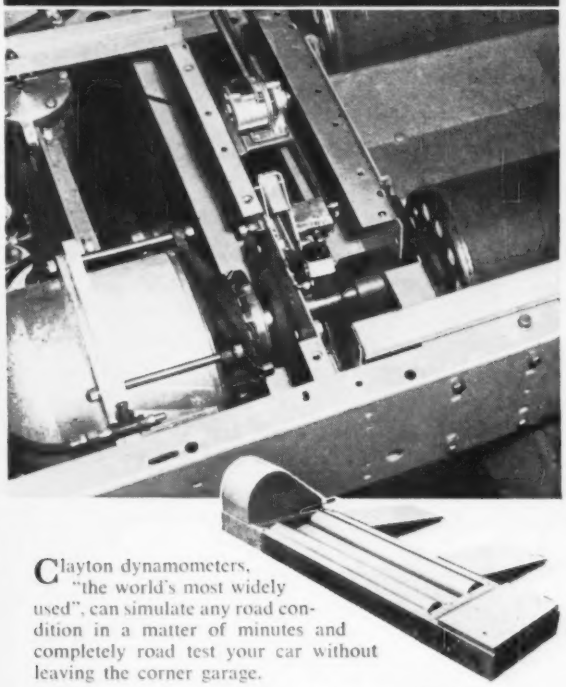
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Warehouse Sales Reflect Upswing

More activity at service centers is a good sign the steel market is improving.

Distributors, in turn, are checking their own inventories and, in some cases, placing more orders with mills.

■ Service center sales and re-ordering from mills indicate the market is heading upward.

This month opened slowly for the warehouses. But activity is on the upswing. Distributors in several market areas admit this. They point out the market is still far from a runaway. However, the signs of improvement are widespread.

Good April — Midwest warehouses, with sales improving, are stepping up their own buying from mills. An East Coast warehouseman says, "March was 20 pct better than February. April looks good. The market is still spotty, but when customers order, they want—and need—fast delivery." Detroit area service centers are placing more bar orders.

With all this going on, the distributors are keeping a close check on their inventories. Some have already increased mill orders. Others are reviewing and revising long-range inventory plans.

Mills have noticed the trend. Warehouses are constantly checking the producers about delivery schedules. The mills, in turn, are under a growing strain to make rush-rush shipments.

Strip mills in the Midwest are already running into trouble on this account. It could spread to other products and areas as the order upturn continues.

Sheet and Strip—Sales are moving at a faster pace. Specialized products, including galvanized and tinplate, are leading the advance. But most sheet and strip products are included. And the improvement is reported in many markets.

East Coast buyers and warehouses have stepped up purchases to meet immediate needs or fill inventory gaps. Coated sheets are running 6 to 8 weeks at mill level. One large mill is booked out on galvanized through June 15.

At **Pittsburgh,** more large orders for sheet are coming in to mills. In one case, a buyer asked for delivery of 200 tons and came back the next day for 600 tons. Appliance and general sheet users are providing the market lift. Auto steel demand is still below normal.

However, a **Detroit** area mill isn't counting on new orders from automakers until the last part of this month. In the meantime, a good number of miscellaneous buyers are now ordering. Fast delivery is usually requested.

Midwest mills noticed greater sales activity several weeks ago, high-lighted by gains in galvanized sheet. More rush orders for cold-rolled sheet are creating difficulties for some mill suppliers. The same thing has happened in strip.

Plates and Shapes—**Eastern** mills are encouraged by a mild stepup in order volume. Fabricators are building inventories against pending construction jobs. But mill deliveries on standard shapes are still 2 to 4 weeks. Carbon plate is running 2 to 3 weeks. Alloy, clad and stainless plate are somewhat better.

Pittsburgh mills say April will be a little better than March, but only slightly. May is expected to show a further gain. But the mills say only a "creeping climb" can be looked for, at least on present evidence.

Pipe and Tubing—Seamless pipe is a little improved, according to **East Coast** suppliers. Buttweld is not doing quite as well. Oil country goods are moving upward in the **Pittsburgh** market. Most orders are placed on a day-to-day basis and coming out of mill downriver stocks. However, one mill says it is now getting a few bargeload orders. Jobbers and producers in the Southwest are reported cleaned out of inventory.

Stainless — Several more mills, including Jones & Laughlin, Allegheny Ludlum, and Crucible, have moved to meet the reduced prices for stainless 410 bars, billets, and wire. (See IA, April 13, p. 182.) The changes were first announced by Carpenter Steel Co. Not all producers have acted as yet on the reduction.

Bars—Orders for bar are not showing as much strength as sheet products. But some producers say sales are better. One **Midwest** mill reports bar mill operations have been "very satisfactory" during the last month. Bookings are also better.

Steel Shipments—February shipments of finished steel products totaled 4.2 million net tons, the American Iron and Steel Institute reports. This compares with 4.6 million tons in January and 7.6 million tons shipped in February, 1960.

PURCHASING AGENT'S CHECKLIST

Metalworking's decision makers cautiously optimistic about business, move ahead with business plans. P. 101

Are price rises for bearings coming? P. 105

Packaging costs are increasing, but attractive packaging can boost sales and profits. P. 106

COMPARISON OF PRICES

(Effective April 17, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Apr. 17 1961	Apr. 10 1961	Mar. 20 1961	Apr. 19 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Apr. 17 1961	Apr. 10 1961	Mar. 20 1961	Apr. 19 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb.‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$35.50*	$36.50	$35.50	$34.50
No. 1 steel, Phila. area	40.50*	42.50	42.50	34.50
No. 1 steel, Chicago	37.50*	38.50	37.50	31.50
No. 1 bundles, Detroit	34.50	34.50	33.50	30.50
Low phos., Youngstown	38.50*	39.50	40.50	36.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	45.50	50.50
No. 1 mach'y cast, Phila.	50.50	50.50	50.50	51.50
No. 1 mach'y cast, Chicago	49.50*	50.50	51.50	52.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$37.83*	$39.17	$38.50	$33.50
No. 2 bundles	25.83*	27.17	27.83	22.83
Coke Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.00	29.00	29.00	33.00
Copper, Lake, Conn.	29.00	29.00	29.00	33.00
Tin, Straits, N. Y.	100.50†	100.50	100.50	99.00
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	28.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

THE 52100 HOUSE

PETERSON STEELS, INC.

Union, N. J. · Wethersfield, Conn.
Detroit, Mich. · Melrose Park, Ill.

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*Appears in the April 13-April 27 issues.

INDUCTION CONSUMABLE LEADED

PETERSON STEELS, INC.

Union, N. J. · Wethersfield, Conn.
Detroit, Mich. · Melrose Park, Ill.

Market Drops Another Notch

Scrap prices fell again this week. Export interest is weakening and domestic support is missing.

Some scrapmen still refuse to sell during the downtrend. They feel May could bring higher prices. Others say lower prices will come.

■ Scrap prices continued to drop in most markets this week. And those areas which didn't report drops are apparently poised for a downward move.

The key is still weak domestic demand. Exporters haven't come in for major tonnage thus far and scrap is piling up. However, dealers are still holding off as prices fall. They are refusing to sell any large tonnage in anticipation that May will bring another upswing. Yet there is a feeling prevalent that more drops may come next month.

This price weakness comes at a time when steel demand is gaining. Some scrapmen base their hopes for higher prices on an increase in steel activity. And they are willing to sit out the downtrend again with that thought in mind.

The IRON AGE composite price for No. 1 heavy melting is down to $37.83 this week. This is its lowest level in more than a month. The composite price for No. 2 bundles dropped to $25.83.

Pittsburgh—The market slipped a notch this week as prices reacted to the weakness in other areas. Local demand is still lagging and pressures applied by outside forces have been eased. As a result, brokers are talking prices $2 and $3 under current levels for openhearth grades. One mill has put out feelers for No. 2 bundles at $26 and has withdrawn a price of $28 for bundles. A mill in a nearby district is reported out of the market entirely. On a late list, No. 1 railroad heavy melting went for about $1 under both last month's price and the peak reached by earlier lists this month. All of which adds up to price weakness at a time when steel demand is climbing steadily.

Chicago — Price declines coaxed some buyers into the open this week, but tonnages continue small. A few yards started laying down material, expecting gains in May. Brokers and dealers continue to hold back from writing any volume orders at reduced price levels. Export purchases are reported, but volume is low.

Philadelphia — Export shipments continue at a steady pace. But export prices are dropping. On top of this, domestic interest is still lacking. The overall market here reflects a weakening trend. Prices in some key grades dropped this week for the first time in months. And, there is some feeling among scrapmen that further price drops may be in line.

New York—Steelmaking grades are off $1 this week. It's more a matter of sharply increasing supply of scrap than any major drop in demand. One dealer says "Every so often the exporters decide to test the market by holding off for a few days. This time, with increasing tonnages of scrap available, we had to come down $1." Another dealer notes the market is steady at the lower price.

Detroit—Exporters are still shying away from this market. Dealers predict lower prices are coming on May's industrial list. There are no reports of new orders. But there is some feeling exporters won't stay away too long. Mill operating rates are increasing slightly.

Cleveland—Market slid back $1 as a Valley mill made a mid-month purchase of dealer grades at $38. The flow of scrap to dealer yards has slowed down and brokers are in no hurry to cover orders.

Cincinnati—Market has softened in a technical reaction to the recent swift increases. May prices are expected to be lower.

St. Louis—All signs point to a downward trend in scrap prices here. However, at the present time prices are unchanged. But it seems only a matter of time before the decline comes. Export market is still soft and domestic demand is missing.

Birmingham — The pickup in buying by domestic consumers that started last week came to an abrupt halt. Brokers say this is because there is little difficulty in filling orders.

Buffalo—Local mills bought this week in limited amounts raising some prices $2 per ton. Sales were made in No. 2 heavy melting, No. 2 bundles, No. 1 machinery cast and No. 1 cupola cast.

Boston—There is still fair demand from exporters and domestic buyers. Nevertheless, scrapmen are losing optimism and price reductions may come soon.

West Coast — Prices are soft. Some dealers wouldn't be surprised to see a drop in May. In Los Angeles, San Francisco and Seattle, exporting is practically the only activity.

Houston—The market retains its status quo. But there are signs of weakness. Exporters show less interest in scrap now.

SCRAP PRICES *(Effective April 17, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	43.00 to 44.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Low phos. punch'gs plate	43.00 to 44.00
Heavy turnings	31.00 to 32.00
No. 1 RR hvy. melting	40.00 to 41.00
Scrap rails, random lgth	46.00 to 47.00
Rails, 2 ft and under	51.00 to 52.00
RR specialties	44.00 to 45.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	35.00 to 36.00
Stainless	
18-8 bundles and solids	180.00 to 185.00
18-8 turnings	105.00 to 110.00
430 bundles and solids	80.00 to 85.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	37.00 to 38.00
No. 1 factory bundles	43.00 to 44.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	45.00 to 46.00
Low phos. punch'gs plate, ¼ in. and heavier	43.00 to 44.00
Low phos. 2 ft and under	41.00 to 42.00
No. 1 RR hvy. melting	40.00 to 41.00
Scrap rails, random lgth	48.00 to 49.00
Rerolling rails	58.00 to 60.00
Rails 2 ft and under	51.00 to 52.00
Angles and splice bars	46.00 to 47.00
RR steel car axles	59.00 to 61.00
RR couplers and knuckles	46.00 to 47.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	44.00 to 45.00
Cast iron wheels	36.00 to 37.00
Malleable	48.00 to 49.00
Stove plate	39.00 to 40.00
Steel car wheels	44.00 to 45.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	85.00 to 90.00
430 turnings	50.00 to 55.00

Philadelphia Area

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	15.00 to 16.00
Mixed bor. short turn.	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	27.00 to 28.00
Low phos. 5 ft and under	44.00 to 45.00
Low phos. 2 ft punch'gs	46.00 to 47.00
Elec. furnace bundles	43.00 to 44.00
Heavy turnings	27.00 to 28.00
RR specialties	45.00 to 46.00
Rails, 18 in. and under	52.00 to 54.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	40.00 to 41.00
Cast iron car wheels	42.00 to 43.00
Malleable	48.00 to 49.00
No. 1 machinery cast.	50.00 to 51.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	28.50 to 29.50
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	11.00 to 12.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	38.00 to 39.00
Rails, random length	41.00 to 42.00
Rails, 18 in. and under	46.00 to 47.00
No. 1 cupola cast.	34.00 to 35.00
Heavy breakable cast.	28.00 to 29.00
Drop broken cast.	45.00 to 46.00

Youngstown

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Low phos. plate	38.00 to 39.00

Cleveland

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	33.50 to 34.50
No. 1 factory bundles	41.00 to 42.00
No. 2 bundles	22.50 to 23.50
No. 1 busheling	33.50 to 34.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	39.00 to 40.00
Low phos. punch'gs plate	34.50 to 35.50
Drop forge flashings	33.50 to 34.50
Foundry steel, 2 ft & under	33.00 to 34.00
No. 1 RR hvy. melting	38.50 to 39.50
Rails 2 ft and under	51.00 to 52.00
Rails 18 in. and under	53.00 to 54.00
Steel axle turnings	26.00 to 27.00
Railroad cast.	47.00 to 48.00
No. 1 machinery cast.	47.00 to 48.00
Stove plate	41.00 to 42.00
Malleable	46.00 to 47.00
Stainless	
18-8 bundles	170.00 to 175.00
18-8 turnings	95.00 to 100.00
430 bundles	85.00 to 90.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	31.00 to 32.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	15.00 to 16.00
Low phos. plate	37.00 to 38.00
Structurals and plate, 2 ft and under	39.00 to 40.00
Scrap rails, random lgth	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 cupola cast.	38.00 to 39.00

St. Louis

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	29.00 to 30.00
Foundry steel, 2 ft	32.00 to 33.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	12.50 to 13.50
Shoveling turnings	14.50 to 15.50
Cast iron borings	21.00 to 22.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	43.00 to 44.00
RR specialties	39.00 to 40.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	33.00 to 34.00
Stove plate	33.00 to 34.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	54.00 to 55.00
Unstripped motor blocks	35.00 to 36.00

Birmingham

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	37.50 to 38.50
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	36.50 to 37.50
Elec. furnace, 3 ft & under	36.00 to 37.00
Bar crops and plate	43.00 to 44.00
Structural and plate, 2 ft	42.00 to 43.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rail, random lgth	41.00 to 42.00
Rails, 18 in. and under	46.00 to 47.00
Angles and splice bars	43.00 to 44.00
No. 1 cupola cast.	43.00 to 44.00
Stove plate	43.00 to 44.00
Cast iron car wheels	35.00 to 36.00
Unstripped motor blocks	33.00 to 34.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	25.00 to 26.00
No. 2 dealer bundles	19.00 to 20.00
Machine shop turnings	5.00 to 6.00
Mixed bor. and turn.	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	30.00 to 31.00
Drop forge flashings	29.00 to 30.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	29.00 to 30.00
Mixed cupola cast.	35.00 to 36.00
Automotive cast.	40.00 to 41.00
Stainless	
18-8 bundles and solids	155.00 to 160.00
18-8 turnings	55.00 to 60.00
430 bundles and solids	60.00 to 65.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.50 to $30.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	4.00 to 4.50
Shoveling turnings	9.50 to 10.00
Clean cast. chem. borings	15.50 to 16.50
No. 1 machinery cast.	40.00 to 41.00
Mixed cupola cast.	32.00 to 32.50
Heavy breakable cast.	28.00 to 29.00

San Francisco

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	40.00
No. 1 dealer bundles	30.00
No. 2 bundles	25.00
Machine shop turn.	15.00
Cast iron borings	15.00
No. 1 cupola cast.	$46.00 to 47.00

Los Angeles

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	40.00
No. 1 dealer bundles	31.00
No. 2 bundles	27.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron borings	15.00
Elec. furnace 1 ft and under (foundry)	$48.00 to 50.00
No. 1 cupola cast.	45.00 to 46.00

Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	40.00
No. 2 bundles	25.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$31.00
No. 2 hvy. melting cut 3 ft and under	28.00
No. 1 dealer bundles	31.00
No. 2 bundles	21.00
Mixed steel scrap	23.00
Bush., new fact., prep'd	31.00
Bush., new fact., unprep'd	25.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	36.00
No. 2 bundles	28.00
Machine shop turn.	8.00
Shoveling turnings	11.00
Cut structural plate 2 ft & under	$50.00 to 51.00
Unstripped motor blocks	32.00 to 33.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	30.00 to 31.00

Kennecott Move Affects Price

Kennecott Copper's return to a 7-day week had quick impact on the copper market.

The extra output slowed any move to increase prices.

■ Kennecott Copper Corp. knocked some of the impetus out of any move by the industry toward higher copper prices.

Late last week the company announced it was going back to a 7-day week in Utah, Nevada, Arizona, and New Mexico. Kennecott had cut back to 6 days early in February because of the oversupply of copper on the domestic market.

The additional day could add 4500 tons per month to Kennecott's output. And the effect of this production hike was quickly felt on the market.

Scrap Savings — Copper scrap dealers had been holding back, looking for a higher price. But the day after Kennecott's move, buyers for major custom smelters reported they were getting what they wanted —at ¼¢ per lb less.

Speculative influences on the market eased. Futures were lower in both London and New York.

A spokesman for one major producer says business started easing off right after the Kennecott move. But he isn't disappointed. There had been a "flush of business" in the two weeks previous which he feels was at least partially caused by buying in anticipation of higher prices.

Inventory Buildup—A sales head for another producer sees some inventory rebuilding in the current orders.

Why did Kennecott boost output?

"A higher copper production rate is required to meet the recent increased demand," explained C. D. Michaelson, general manager of Kennecott's Western Mining Div.

But few in the industry believe this is the whole story.

Some Factors—Here are some things copper men feel Kennecott considered:

"Kennecott is trying to salt away a kitty," says one. "I've heard that Kennecott is quietly telling some customers not to worry; that they'll be taken care of this summer."

Kennecott's contract with United Steelworkers at its Utah and Arizona operations expires July 31. Most copper people expect some serious headbumping at this year's negotiating table.

New Team—"There's a changing of the guard at Kennecott, and the new man is trying his wings," says another copper spokesman. Charles Cox, current president, is going to retire soon. Some sources suggest this month.

The industry expects the new president of Kennecott to be Frank R. Milliken, now executive vice president. He is very highly regarded in international copper circles.

Govt. Control—"There's a lot more to be considered here," says another observer. "Kennecott may not have wanted higher prices. Management may feel the day of frequent price hikes is over. A price hike now could invite immediate probes by government. Several of them could invite some degree of control. Kennecott doesn't want this. Besides, Kennecott hopes it will sell more copper at lower prices, and that is the real future of the industry."

Deliveries Up

The latest statistics from the Copper Institute indicate business is definitely picking up. Deliveries to fabricators in the U. S. were up to 111,924 tons in March, highest since the recession began.

And stocks unsold at the refineries dropped for the first time since mid-1960. They are now 139,562 tons.

A note of caution: Refined production in the U. S. rose last month to 151,833 tons, from 134,812 tons the previous month.

A sales spokesman for one major copper producer says April shipments will likely show another sharp increase. But he fears some of this has been hurry-up buying to beat a possible price hike. If the price doesn't go up, he expects some leveling off in May shipments.

Tin Prices for the Week

April 11—107.75; April 12—109.50; April 13—108.50; April 14—107.375; April 17—107.00.*

* Estimate.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum ingot	26.00	24.70	12/17/59
Copper (E)	29.00	30.00	1/16/61
Copper (CS)	29.00	30.00	1/11/61
Copper (L)	29.00	30.00	1/16/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 187.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	13/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13	.....	51.36	55.32
Brass, Yellow	48.10	48.39	48.04	52.26
Brass, Low	50.65	50.94	50.59	54.71
Brass, Red	51.54	51.83	51.48	55.60
Brass, Naval	52.86	59.17	46.67	57.02
Muntz Metal	50.94	.....	46.25	.....
Comm. Bz.	52.98	53.27	52.92	56.79
Mang. Bz.	56.80	.....	50.20	.....
Phos. Bz. 5%	54.59	74.34	75.09	76.52

Free Cutting Brass Rod 33.71

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb otherwise noted)

Antimony, American, Laredo, Tex. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base ..... $ 1.31
Cobalt, 97-99% (per lb) ..... $1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz. $ 2.25
Iridium, dollars per troy oz. ..... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $206 to $208
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz. ..... $24 to $26
Platinum, dollars per troy oz. ..... $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 29.25
No. 120 ..... 28.50
No. 123 ..... 27.75
80-10-10 ingot
No. 305 ..... 33.50
No. 315 ..... 31.25
88-10-2 ingot
No. 210 ..... 41.25
No. 215 ..... 38.00
No. 245 ..... 33.25
Yellow ingot
No. 405 ..... 25.00
Manganese bronze
No. 421 ..... 28.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.25-24.50
0.60 copper max. 24.00-24.25
Piston alloys (No. 132 type) 26.00-27.00
No. 12 alum. (No. 2 grade) 22.75-23.25
108 alloy 23.25-23.75
195 alloy 25.75-26.75
13 alloy (0.60 copper max.) 24.00-24.25
AXS-679 (1 pct zinc) 23.00-24.00

Steel deoxidizing aluminum notch bar granulated or shot
Grade 1—95-97½% 23.75-24.75
Grade 2—92-95% 22.50-23.50
Grade 3—90-92% 21.50-22.50
Grade 4—85-90% 21.00-22.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	25	24¼
Yellow brass	19¼	17⅜
Red brass	22¼	21½
Comm. bronze	23	22¼
Mang bronze	18⅛	17⅜
Free cutting rod ends.	18⅜	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¼
No. 2 copper wire 24½
Light copper 22¼
*Refining brass 23¼
Copper bearing material 22¼
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¼
No. 2 copper wire 24½
Light copper 22¼
No. 1 composition 22½
No. 1 comp. turnings 22
Hvy yellow brass solids 16½
Brass pipe 15½
Radiators 17½

Aluminum

Mixed old cast. ..... 12½—13
Mixed new clips ..... 14½—15
Mixed turnings, dry ..... 13½—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 23¼—23¾
No. 2 copper wire ..... 21¾—22¼
Light copper ..... 19½—19¾
Auto radiators (unsweated) .. 15 —15½
No. 1 composition ..... 18½—19
No. 1 composition turnings .. 17½—18
Cocks and faucets ..... 15 —15½
Clean heavy yellow brass .... 12 —12½
Brass pipe ..... 15½—16
New soft brass clippings .... 15 —15½
No. 1 brass rod turnings .... 15 —15½

Aluminum

Alum. pistons and struts .... 7 — 7½
Aluminum crankcase ..... 9½—10
1100 (2s) aluminum clippings 12¼—12⅝
Old sheet and utensils ..... 9½—10
Borings and turnings ..... 4½— 5
Industrial castings ..... 10 —10½
2020 (24s) clippings ..... 11 —11½

Zinc

New zinc clippings ..... 5½— 5¾
Old zinc ..... 2¾— 3
Zinc routings ..... 1¾— 2
Old die cast scrap ..... 1 — 1¼

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 23-23.50
Clean Monel turnings 16.50-17
Old sheet Monel 22-23
Nickel silver clippings, mixed. 18
Nickel silver turnings, mixed. 15

Lead

Soft scrap lead ..... 7 — 7½
Battery plates (dry) 2⅝
Batteries, acid free ..... 2 — 2¼

Miscellaneous

Block tin ..... 78 —79
No. 1 pewter ..... 59 —60
Auto babbitt ..... 44 —45
Mixed common babbitt ..... 9½—10
Solder joints ..... 14½—15
Small foundry type ..... 8½— 9
Monotype ..... 8¾— 9¼
Lino. and stereotype ..... 8— 8¼
Electrotype ..... 7½— 7¾
Hand picked type shells ..... 5¼— 5¾
Lino. and stereo. dross ..... 1¾— 2¼
Electro dross ..... 2 — 2½

(Effective Apr. 17, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3, B4, M10* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, City, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective Apr. 17, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*				$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*	Holloware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*	6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1,Y1*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1†† R3*	7.525 *R3, S1*	9.275 *R3*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3,P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*		6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.90 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2,R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective Apr. 17, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforc-ing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.		5.675 *B3*									
	Fairless, Pa.	5.825 *U1*	5.825 *U1*									
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*	5.00 *A8*									8.00 *A8* 8.35 *M4*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Apr. 17, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	7.87	9.71	10.16	11.35	9.70	9.95	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.59	9.45	8.41	8.47	8.26	13.14	16.76	16.65	.....	.....
Boston	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.79	16.79	21.89	21.14
Buffalo	.15	8.70	9.45	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.85	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.90	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	11.20	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		10.17	10.98	11.35[3]	11.73	9.41	9.81	9.58	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	11.20	12.20	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.13	10.50	10.95	11.44	9.47	9.82	8.97	12.89	.....	.....	.....	.....
Milwaukee**	.15	9.51	10.49	10.99	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.24	20.49
New York	.10	9.77	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.90	10.10	10.76	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		9.45	11.30	12.35	12.40	10.55	11.00	9.45	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.27	11.79[2]	11.50	11.88	10.48	10.59	10.17	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.75	11.23	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	9.72	10.39	11.54	11.89	9.56	10.07	9.72	11.64		16.69		21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1¼" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 12¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Apr. 17, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *I1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R5*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	73.00
Lyles, Tenn. *T4*	.....	.....	.....	.....	.....
Midland *C1*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31 0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01 15.50), $101.00; Keokuk (14.01 14.50), $89.00; (15.51 16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

⅜ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 1¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Apr. 17, 1961)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	--	19.25-21.50	—	19.75-21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25-26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.50-31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	34.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25-29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A5;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A5;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R5;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb, higher); Seymour, Conn., *S15,* (25¢ per lb, higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb, higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A5;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A5;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2,* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A5;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2,* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals. Baltimore, *A7,* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A5;* Syracuse, *C11;* S. Chicago. *U1.*

Plates. Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A5,* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A5;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢ lb.	¢ lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	...	...	...	...	...	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	...	...	...	...	...	9.00	9.55
Chicago *W7*	173	...	...	...	...	9.00	9.55†
Cleveland *A6*	...	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	9.00	...
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	...	...	...	...	...	...
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	...	...	...	...	...	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	...	...	...	...	...	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	...	...	...	236	...	9.95	10.50
Sparrows Pt. *B3***	175	...	...	215	198	9.10	9.775
Struthers, O. *Y1**	...	...	...	...	...	8.65	9.20
Worcester *A5*	179	...	...	...	...	9.30	9.85
Williamsport *S5*	...	...	...	...	...	...	...

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

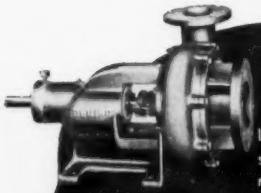
Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

PUMPS THAT "GROW"

Versatile Centrifugal



Interchangeable on the same power frame, you need merely put larger liquid ends and motors on Deming End Suction Centrifugals to increase your pumping capacity as your production needs grow. Literally thousands of everyday parts combinations. Standard parts—no inventory problems. Write today for full information.

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NEW room-temp curing epoxy — spreads like cold cream!

Now — save application time, slash material costs, with new solvent-free epoxy adhesive, BONDMASTER M688:

- Smoothly spreadable with trowel, spatula, etc.
- Non-sag, even while curing. Eliminates all clean-up.
- Cures at room temp. in about 24 hrs. or in as little at 10 min. at 250°F.
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- Solvent-free . . . no wait for evaporation . . . no danger of attack on plastics.

Bonds ALL metals and just about *any* plastics—rigid, foamed, or flexible.

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232 BELLEVILLE AVE., BLOOMFIELD, N. J.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	....	....	....
Cleveland *R3*	....	....	....	....	....	15.35
So. Chicago *R3*	....	....	....	10.10	....	....
Ensley *T2*	5.75	6.725	....	....	....	....
Fairfield *T2*	....	6.725	....	10.10	6.875	....
Gary *U1*	5.75	....	....	....	6.875	....
Huntington, *C16*	....	6.725	....	....	....	....
Ind. Harbor *I3*	....	....	....	10.10	....	....
Johnstown *B3*	....	6.725	....	....	....	....
Joliet *U1*	....	....	7.25	....	....	....
Kansas City *S2*	....	....	....	10.10	....	15.35
Lackawanna *B3*	5.75	6.725	7.25	....	6.875	....
Lebanon *B3*	....	....	7.25	....	....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	....	....	....	....	....	15.35
Pittsburgh *J3*	....	....	....	10.10	....	....
Seattle *B2*	....	....	....	....	6.75	15.85
Steelton *B3*	5.75	....	7.25	....	6.875	....
Struthers *Y1*	....	....	....	10.10	....	....
Torrance *C7*	....	....	....	....	6.75	....
Williamsport *S5*	....	6.725	....	....	....	....
Youngstown *R3*	....	....	....	10.10	....	....

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	9.10	....	....	....	....
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	....	....
Detroit *D1*	9.05	10.50	12.70	15.70	....
Detroit *D2*	9.05	10.50	12.70	....	....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	....	....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	....
New Britain, Conn. *S7, a*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	....
New Castle, Pa. *M10, a*	8.95	10.40	12.60	15.60	....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	....	10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

Rolled elliptical, 18 in. or longer, 5000 lb lots 42.50

Electrodeposited, 5000 lb lots ... 35.50

OFHC anodes ..... 40.50 to 43.50 (depending on shape)

Brass, 80-20, ball anodes, 2000 lb or more 50.50

Zinc, ball anodes, 2000 lb lots ..... 18.75 (for elliptical add 1¢ per lb)

Nickel, 99 pct plus, rolled carbon, 5000 lb ..... 1.0225 (Rolled depolarized add 3¢ per lb)

Cadmium, 5000 lb 1.50

Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum, N. Y.. 65.90

Copper sulphate, 25.2 Cu min, 6000 lbs per cwt, Detroit 17.45

Nickel sulfate, 5000 lbs 29.00

Nickel chloride, freight allowed, 100 lb 45.00

Sodium cyanide, domestic, f.o.b. Chicago, 200 lb drums 24.00

Zinc cyanide, 100 lb, N. Y. 60.75

Potassium cyanide, 100 lb drum N. Y. 45.50

Chromic acid, flake type, 10,000 lb or more, N. Y. 30.44

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R. 11.50

Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots 25.75

Carbonyl Iron (200 lb lots) 88.00

Welding Grades 8.10

Cutting and Scarfing Grades 9.85

Hydrogen reduced, domestic 11.25

Copper Powders

Molding Grades

Electrolytic, domestic, f.o.b. shipping point. 15.00†

Atomized ..... 42.3 to 60.3

Reduced ..... 15.00†

Chemically Precipitated 43.5

Brass, 5000-lb lots ..... 32.3 to 48.9

Bronze, 5000-lb lots ..... 50.3 to 54.2

Chromium, electrolytic 5.00

Lead ..... 7.50†

Manganese, electrolytic ... $1.00

Molybdenum ..... $3.60 to $4.35

Nickel $1.15

Carbonyl Nickel, 20,000 lb lots $1.01

Nickel-Silver, 5000 lb lots.. 57.9 to 65.9

Silicon 70.00

Solder ..... 7.00†

Stainless Steel, 316 ..... $1.07

Stainless steel 304 ..... 89.00

Tin ..... 14.00†

Titanium, 99.25 + pct, per lb, f.o.b. $11.25

Tungsten, carbide grades... $3.25

Zinc ..... 19.5 to 32.7

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	....	9.875	....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	....	12.475	....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, P2, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	....	....	....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	....
	410	22.70	24.85	27.00	....
	430	23.45	25.65	27.90	....

CR Strip (S9) Copper, 10 pct, 2 sides, $43.00; 1 side, $36.10.

(Effective Apr. 17, 1961)

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.... $185.00

High duty (except Salina, Pa., add $5.00) 140.00

Medium duty 125.00

Low duty (except Salina, Pa., add $2.00) 103.00

Ground fire clay, net ton, bulk... 22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $158.00

Childs, Hays 163.00

Chicago District 168.00

Western Utah 183.00

California 185.00

Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O. 163.00-168.00

Silica cement, net ton, bulk, Chicago 26.75

Silica cement, net ton, bulk, Ensley, Ala. 27.75

Silica cement, net ton, bulk, Mt. Union, Pa. 25.75

Silica cement, net ton, bulk, Utah and Calif. 39.00

Chrome Brick

Standard chemically bonded, Baltimore, Md. $620.00

Gary, Ind. 658.50

Standard, Pascagoula, Miss. 647.50

Standard chemically bonded, Curtiner, Calif. 119.00

Burned, Baltimore 585.00

Magnesite Brick

Standard, Baltimore $715.00

Chemically bonded, Baltimore 655.00

Chemically bonded, Pascagoula, Miss. 682.50

Grain Magnesite

St. ⅜ to ½-in. grains *Per net ton*

Domestic, f.o.b. Baltimore in bulk. $73.00

Domestic, f.o.b., Pascagoula, Miss... 80.00

Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk 46.00

in sacks 52.00-54.00

Dead Burned Dolomite

F.o.b. bulk, producing points in: Pa., W. Va., Ohio $16.75

Missouri Valley 15.60

Midwest 17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
Jones & Laughlin *	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

* Electricweld only.



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YOU BUY WHAT YOU NEED... NO MORE. Furthermore, the cost of unwanted crop ends can be eliminated and tubes can be cast to specified lengths from 4 feet to 20 feet. Longer lengths are made by welding.

OTHER ADVANTAGES? ACIPCO's complete "under one roof" operations — including heat treating, machining and welding — save you the delays and excessive costs that often result in buying from multiple supply sources.

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*Patent applied for

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NEvins 8-3566

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50 Ton Slag Std. Ga. w/300 Cu. Ft. Ladles (2)
50 Ton Slag Std. Ga. w/260 Cu. Ft. Ladles (2)
50 Ton Transfer Std. Ga. 230V. DC
10 Ton Quenching Std. Ga. 41'6" Wheelbase

OVERHEAD CRANES 230V. D.C.
110 Ton Cleveland Ladle 48'5" Span
20 Ton Shaw 41'7" Span, Cab Oper.
10 Ton Shaw 52' Span, Cab Oper.
10 Ton Bedford ¾ Yd. Bucket 61' Span

ELECTRIC BRIDGE 230V. D.C.
Travelling on Rail, 230' Span, plus 80' Cantilever, 6 Ton Bucket, Single Trolley, Motor Driven

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Koppers 2 Roll CRUSHER 36"x42", 40 HP
Trimmer CONVEYOR 30"x13'3" c/c Cleated
100 Ton PRINTOMATIC Larry Car SCALE, 14'8" c/c Rail
50 Ton 60' Platform Printomatic TRUCK SCALE
30 Ton 40' Platform Printomatic TRUCK SCALE
CAR HAULS, Drum Type 20"x18", 25 HP
SKIP HOIST Lidgerwood 178'
MOTORS, DC Type CO & MD Series & Compound Wound 230V. 1 to 200 HP (100)
MOTORS, AC 3/60/440V. Squirrel Cage & Slip Ring 1 to 100 HP (100)

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Sales Still Slow In New York

Used machinery dealers in New York say there is more confidence apparent now. But it isn't reflected in sales.

They agree the market has hit bottom and an upturn is just around the corner.

▪ "There's a lot more talk and a lot more confidence around than there was six months ago," says a used machinery dealer in New York. "But so far I can't see it showing up in my sales."

Activity started to shape up in this market at the beginning of the year. Then business stumbled in February. And now it's just about back to where it was in January.

Dealers aren't pessimistic. But they're not very optimistic either. On one hand, they say business isn't very good. On the other, most expect 1961 to shape up and top 1960.

They say the rate of inquiries is improving. Normally this would bring out predictions of better sales just around the corner. Traditionally sales are made in pretty predictable proportion to inquiries.

On Guard—But the February lull has everyone on guard. They're hoping for, but not predicting, a much firmer second quarter.

One thing dealers do agree on: The used machinery market in New York has hit bottom. One dealer suggests it may have hit as early as last fall.

The market, they say, has been bumping around the bottom for some time. Everyone is sure it is going to pick up. No one is sure when. In fact, a large percentage of the dealers don't see an upturn sharp enough to be called a trend until the third quarter.

Prices Stable—Generally, prices are weathering the uncertainty well.

"It's the old story of supply and demand," notes one dealer. "I've got one machine that's pretty much exclusive," he says. "And I'll get my price for it. But if I take in just a standard lathe there are probably 50 like it on the market."

Most dealers are not unhappy about prices. The one who is buying is going to get a good deal, because the original seller probably needed the money, they say. And there is enough room in current price levels for dealers to make a profit.

Less Leasing — Leasing is apparently dieing out in the used machinery market here. Some dealers will still lease out machinery. But a growing number are dropping this except for very small and portable equipment.



"So much for the facts, gentlemen. Now let's get down to the serious guesswork—"

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100 CFM	150 psi	6 x 7 Ing.
158 CFM	100 psi	7 x 7 Ing.—CPT—Worth.
142 CFM	125 psi	Ingersoll Rand Type 40-Ingor.
183 CFM	150 psi	7 x 7 Joy WG9.
194 CFM	125 psi	7-7-6 x 5 Worth. M40.
234 CFM	100 psi	9 x 9 Ing.—Worth Chic. Penn.
290 CFM	75 psi	10 x 9 Ing. ES-1
364 CFM	100 psi	10 x 9 Joy WG9.
465 CFM	100 psi	12 x 11 IR—Worth—CP.
502 CFM	125 psi	12 x 13 Ing. Rand. Worth.
676 CFM	100 psi	15-9¼ x 12 Ing. XRB.
686 CFM	100 psi	14 x 13 IR.
860 CFM	100 psi	14½-9 x 7 Ing. Rand. XLE 125 hp. Syn. 3-60-2300—8 PF.
877 CFM	125 psi	17/10½ x 14—IR—XRB.
1670 CFM	100 psi	C300-300H Fuller Rotary. 300 hp. West. Syn. 3-60-440. 80% PF.
2520 CFM	125 psi	17-10¾ x 8 Clark CMA 4L 350 hp. Syn. 3-60-2300.
2800 CFM	45 psi	20-20 x 14 Ing. Rand XRE 250 hp. Syn. 300-550—8 PF.

Portable Gas-diesel 60"-600".

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Qu.	H.P.	Make	Type	Volts	Speed
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1	3500	G.E.	TS 1.0P.F.	4600/2300/4000	360
2	1750	G.E.	ATI	2300	3600
2	500	G.E.	TS 7569	2200	1200
1	400	G.E.	TS 7565	2200	1200
1	325	G.E.	ATI 1.0P.F.	440	1800
2	300	ElMach.	BRKT	2200	1200

SLIP RING

1	1750	G.E.	M-5798	4800	1800
1	800	Whse.	CW	500	1778
1	800	G.E.	MT-428	2300	450
1	600	Whse.	CW 4-32-D-15	440	1778
1	550	Whse.	CW	440	252
1	500	Whse.	CW	550	350
1	300	A.C.	ANY	440/2300	720
1	300	G.E.	MTP-561	2200	1800
1	250	G.E.	IM-16	220/440	875
1	250	Cr.Wh.	Size 29Q	2300	350
1	250	G.E.	MT-424Y	4000	257
1	200	G.E.	IE-13B	220	1890
2	200	Whse.	CW-890	2300	1775
1	200	G.E.	IM	2200	580
1	200	G.E.	IM	440	433
1	125	G.E.	MT-557	220/440	1200
1	125	A.C.	ARY	440	870
3	100	A.C.		440	695
1	100	G.E.	M-6335Z	220/440	580
1	100	Whse.	CW-754C	220/440	900

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4	500	A.C.	ARW	2300	3600
1	500	Whse.	CS-1216	2200	500
2	450	Ell.	F-3910	2200	1200
1	400	Whse.	CS-7151-610H	6600/4000	2565
1	300	Cont.	NL-6868	440	1780
1	300	G.E.	KT-559A	2200	1775
1	300	Whse.	CS-1002	2300	580
1	250	Whse.	CS-8758	2200	1775
2	200	Whse.	CS-8558	220/440	1750

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